

AD-A110 649

INTERNATIONAL RESOURCE DEVELOPMENT INC LA GRANGE IL

F/6 5/1

EVALUATING QUALITY CIRCLES IN U.S. INDUSTRY: A FEASIBILITY STUD--ETC(U)

JUN 82 H N SEELYE, E C STEWART, J A SWEEN

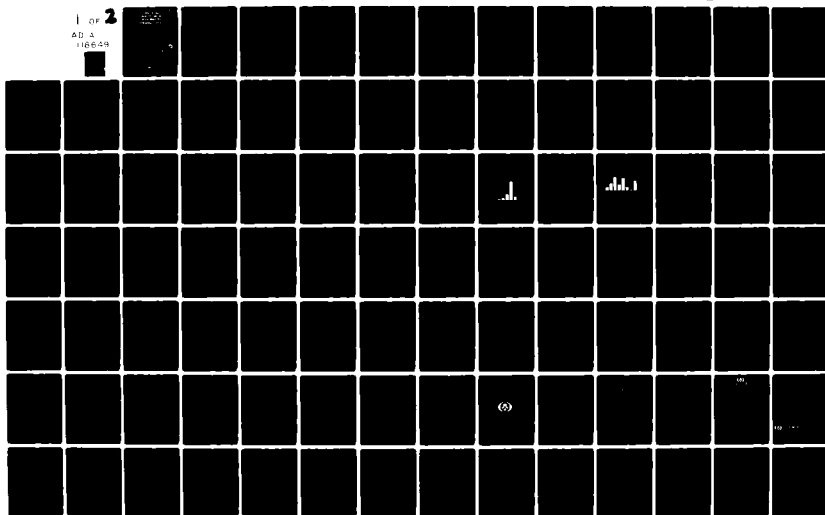
N00014-82-C-0135

UNCLASSIFIED

RR-0NR-82-1

NL

1 of 2
AD A
116649



AD A118649

EVALUATING QUALITY CIRCLES IN U.S. INDUSTRY: A FEASIBILITY STUDY

H. Ned Seelye

Principal Investigator

Edward C. P. Stewart, Ph.D.

Japan Site Coordinator

Joyce A. Sween, Ph.D.

Computer Research Coordinator

Research Report No. ONR-82-1
July 1982

DTIC
SELECTED
AUG 27 1982
H

This study was supported by the Organizational Effectiveness Research Programs,
Psychological Sciences Division, Office of Naval Research, Department of the Navy, under
Contract No. N00014-82-C-0135.

Reproduction in whole or part is permitted for any purpose of the United States Government.
Approved for public release; distribution unlimited.



INTERNATIONAL RESOURCE DEVELOPMENT, INC.

82 08 26 095

copy

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER ONR-82-1	2. GOVT ACCESSION NO. AD A118649	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Evaluating Quality Circles in U.S. Industry: A Feasibility Study	5. TYPE OF REPORT & PERIOD COVERED Technical Report	6. PERFORMING ORG. REPORT NUMBER
	7. AUTHOR(s) H. Ned Seelye, Edward C. P. Stewart, and Joyce A. Sween	8. CONTRACT OR GRANT NUMBER(s) N00014-82-C-0135
9. PERFORMING ORGANIZATION NAME AND ADDRESS International Resource Development, Inc. P. O. Box 721 LaGrange, Illinois 60525	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS NR 170-935	11. CONTROLLING OFFICE NAME AND ADDRESS Organizational Effectiveness Research Programs Office of Naval Research (Code 452) Arlington, VA 22217
12. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)	13. REPORT DATE 30 June 1982	14. SECURITY CLASS. (of this report) UNCLASSIFIED
	15. NUMBER OF PAGES	16. DECLASSIFICATION/DOWNGRADING SCHEDULE
17. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		
18. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
19. SUPPLEMENTARY NOTES Revised versions of three chapters of this report are scheduled to appear in The Quality Circles Journal: November, 1982 (Chapter 2); February, 1983 (Chapter 5); May, 1983 (Chapter 1). These versions will incorporate data that arrived too late for inclusion in the present report.		
20. KEY WORDS (Continue on reverse side if necessary and identify by block number) Productivity Participative management Job satisfaction Japanese management Small groups		
21. ABSTRACT (Continue on reverse side if necessary and identify by block number) This study determined that it is feasible to conduct nationwide experimental research into the effectiveness of the most structured form of participative management--small, specially-trained work groups formed along the lines of Japanese quality control circles.		

DD FORM 1 JAN 73 1473

EDITION OF 1 NOV 68 IS OBSOLETE
S/N 0102- LF-014-6601

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

20. ABSTRACT, con't:

The number of "quality circles" in U.S. industry began to increase dramatically in 1980 and continues to gain wide popularity. Identification was made of over 1500 U.S. work sites with functioning quality circles. Of these, descriptive data were obtained on 713 sites, the vast majority of which were willing to participate in an evaluation of their circles effectiveness and which were past the initial "pilot" stage of quality circles implementation--suggested criteria for inclusion in Phase II research. (A discriminant analysis determined that the characteristics of sites that were willing to participate in Phase II research did not differ substantially from those not willing to participate.)

The range of sites identified is sufficiently broad to constitute a cross-section of U.S. organizations with functioning quality circles. From this pool a Phase II sample can be drawn. The overall number of identified sites is large enough to apply standard techniques for identifying a parsimonious sample within reasonable error limits, based on an identification of the underlying dimensions of the sites through factor analysis. A 2X2X2 factorial design matrix is proposed as an appropriate approach to evaluating the national effectiveness of both blue- and white-collar quality circles, given their current characteristics in U.S. industry.

Through ratings by experts in quality circles and through analyses of the self-ratings of several hundred quality circles leaders and facilitators, the components most closely linked to successful quality circles were identified. These components include: broad support within the organization for quality circles, extensive training for those involved in the program, alleviation of employee fears and confusion concerning the program's goals, extent to which circle gains are measured, and the extent to which circles focus on long-range problem-solving rather than on short-term crises. Four instruments were developed and piloted to measure employee job satisfaction, the effectiveness of quality circles, and organizational readiness for participative management.

EVALUATING QUALITY CIRCLES IN U.S. INDUSTRY: A FEASIBILITY STUDY

T A B L E O F C O N T E N T S

INTRODUCTION	1
Importance of Study	1
Background	1
Objectives of this Feasibility Research	4
Organization of the Report	4
Acknowledgements	6
Chapter 1: ESSENTIAL COMPONENTS OF SUCCESSFUL U.S. QUALITY CIRCLES	9
Chapter 2: INCIDENCE OF QUALITY CIRCLES IN U.S. INDUSTRY	25
Chapter 3: EXPERIMENTAL RESEARCH DESIGN FOR EVALUATING THE IMPACT OF QUALITY CIRCLES	51
Chapter 4: INSTRUMENTATION FOR MEASURING THE IMPACT OF QUALITY CIRCLES	60
Chapter 5: CHARACTERISTICS OF JAPANESE QUALITY CONTROL CIRCLES	62
Chapter 6: GENERAL CONCLUSIONS	70


APPENDIX A: March 1982 Direct-Mail Survey of IAQC Members

APPENDIX B: May 1982 Survey of Readers of The Quality
Circles Journal

APPENDIX C: English-Language Questionnaires:
 Questionnaire for Quality Circles Program Coordinator
 Questionnaire for Quality Circle Leader
 Questionnaire for Quality Circle Members
 Questionnaire on General Work Conditions

APPENDIX D: Japanese-Language Questionnaires:
 Questionnaire for Plant Administrator
 Questionnaire for Quality Control Circles Promoter
 Questionnaire for Quality Control Circle Leader

APPENDIX E: Research Report Distribution List



Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	<input type="checkbox"/>
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A	

INTRODUCTION

Importance of Study. The effectiveness of small work groups affects every Department of Defense installation. These work groups vary in size, personnel training and makeup, and in the nature of the tasks to be accomplished. DoD interest in work groups is not necessarily confined to military installations. The Department of the Navy, for example, contracts with a huge array of civilian organizations differing in size, personnel makeup, and task orientation. Of particular interest to those concerned with the effectiveness of work groups is the relatively recent emergence of participative management techniques where problem-solving is done mostly at the employee level that actually performs the task in question. The most structured example of participative management techniques is the Quality Circles movement, the focus of the present research.

Background. The beginnings of the Quality Circles movement are found in Japan in the early 1950's, when several key U.S. experts in statistical quality control, notably Drs. W. E. Deming and J. M. Juran, gave a series of lectures in Japan. Deming introduced a broad number of Japanese industrial leaders to the potential offered by statistical quality control as a means of improving Japan's international market image, and Juran suggested ways to implement these ideas through small work groups trained in the appropriate techniques. The Japanese Union of Scientists and Engineers (JUSE), the host for these lectures, added a number of changes and

adaptations to the propositions advanced by the U.S. management consultants to facilitate the "fit" into the fabric of that nation's industrial culture. The dramatic success of Japanese industry in the last decade--often putting its U.S. counterparts at a competitive disadvantage--is indisputable. Speculation as to the reason behind this success often focuses on what the Japanese call "quality control circles," a widely employed participative management technique in Japan. By 1979, for example, Nissan Motor company reported 4,162 quality control circles with 35,327 employees (or 99%) participating.

A typical quality control circle in Japan is a relatively autonomous voluntary unit of from five to 10 workers led by a foreman or senior worker. Its major tasks are: (1) to identify job-related problems; (2) to improve methods of production; (3) to develop production skills among its members; (4) to improve worker morale and motivation; and (5) to stimulate teamwork within work groups. Quality control circles usually meet once a week for about two hours--even when the company is doing well. Two Japanese automakers (Toyota Motor Co. and Nissan Motor Co.) report that the average quality control circle worker offers over 11 suggestions per year, of which an average of 89% are adopted by their companies. (On the other hand, General Motors receives an average of less than one suggestion from each employee per year, and adopts one-third of the ideas.)

By 1982, virtually all types of Japanese commerce employ quality control circles. Most organizations in Japan began them in the mid or late 1960's. Japanese management has been particularly enthusiastic about the results of their quality circles program. Indeed, the fit seems so fortuitous, that many U.S. observers

question the cross-cultural transferability to U.S. industry of the basic concept and structure of quality control circles. (A few U.S. firms [e.g., Lockheed] began to employ Japanese quality circles as early as the mid 1970's, but quality circles did not begin to expand substantially in U.S. industry until 1980.)

Empirical industrial research of the type that influences U.S. industrial decision-makers is not part of the research tradition in Japan. Consequently, many U.S. managers wonder whether quality control circles really work as well in Japan as the anecdotal "evidence" seems to indicate. A second concern by U.S. managers is whether the cause for the recent boom in Japanese productivity may not be a function of other variables which may be peculiar to Japanese society. A third concern is, if quality control circles do constitute a key element in the Japanese success story, whether one can transfer successfully these managerial techniques across cultures as is being currently attempted by an increasing number of U.S. organizations. And finally, whether in the process of this cross-cultural transfer of quality control circles technology the essential ingredients (i.e., those that make it work) are preserved.

Replete in the U.S. literature on quality circles are calls for careful evaluations of their effectiveness. As recently as last month a leading proponent of quality circles, Price Gibson, concluded an article in The Quality Circles Journal (May, 1988, pp. 29-31) with the following statement: "Assessment and measurement of quality circles and quality of work life processes may not have been a top priority for process implementors in the '70's, but it will become the bottom line for survival in the '80's."

Objectives of this Feasibility Research. The purpose of the present Phase I feasibility study is to determine whether it is possible to experimentally assess the effectiveness of quality circles on productivity and job satisfaction in U.S. industry. With an eye to the concerns just mentioned by U.S. managers, this feasibility study begins to probe the question of the success of the cross-cultural transfer of what is now considered to be a Japanese technique in participative management.

More specifically, this feasibility study addresses four objectives:

- (1) to identify the components or conditions that are linked to successful quality circles in both the U.S. and Japan;
- (2) to determine whether a sufficiently wide range of U.S. organizations that are willing to participate in government-funded research can be identified to make feasible an experimental evaluation of the effectiveness of their quality circles;
- (3) to develop an experimental research design to measure the impact of quality circles, a design that takes cognizance of the configurations of quality circles in U.S. industry; and
- (4) to develop several appropriate measures of productivity and job satisfaction for both blue- and white-collar quality circles.

Organization of the Report. The feasibility research began without the aid of much prior empirical research into the effectiveness of participative management techniques. IRD had to identify a substantial number of U.S. locations where quality circles

were operating. This was accomplished through correspondence with several hundred specialists in management and through several national surveys of U.S. industry. Because of its comparative interest, quality control circles in Japan also were surveyed. Expert opinion on the components of successful quality circles was elicited. The data collected were subjected to various multivariate analyses in an attempt to answer the questions implicit in the project's four objectives.

Chapter 1 identifies a parsimonious list of variables that are associated with successful quality circles. These variables were identified through ratings by a panel of U.S. experts and through the self-ratings of several hundred practitioners in U.S. industry.

Chapter 2 describes the over 700 U.S. firms that responded to an IRD survey of organizations with functioning quality circles. Descriptions of the characteristics of these organizations, their quality circles, and of their willingness to consider participation in Phase II research are presented.

Chapter 3 describes the process employed to develop an experimental research design appropriate for measuring the effectiveness of quality circles in the U.S. in the Phase II research.

Chapter 4 describes the development of a series of questionnaires that are capable of forming the basis of a Phase II research effort. Four such instruments which were refined after they were piloted in an industrial setting are presented in Appendix C.

Chapter 5 presents the results of a preliminary analysis of about 90 Japanese quality control circles. This analysis presents descriptive information on approximately 60 dimensions. This

information will be useful in Phase II research as the conditions associated with successful U.S. circles are examined in more detail.

Chapter 6 reviews the conclusions of each step of the research and concludes that it is feasible to conduct a national, experimental evaluation of the effectiveness of quality circles.

Acknowledgments. First, we gratefully acknowledge the significant assistance given to the project by the Japanese Union of Scientists and Engineers (JUSE), and especially by its General Manager, Mr. Jungii Noguchi. JUSE provided the cooperation of a knowledgeable liaison person to facilitate IRD's contacting 20 firms in and near Tokyo. We are grateful to the heads of these firms, and to the employees who completed our questionnaires, for their contributions to our quantitative study. JUSE's distinctive contribution of expertise in the design of the study and adaptation of the questionnaires, along with the cooperative liaison with selected Japanese firms, leaves us with a feeling of being honored and with the hope that the results of this study will in a small way register our appreciation to our benefactors from JUSE for the help provided us, at no cost to this project. (It should be noted that most of the analyses of the Japanese data will be reported in subsequent journal articles.)

Second, we appreciate the time and effort that over 1,000 members of the International Association of Quality Circles (IAQC) took in responding to the two questionnaires we sent them, and to IAQC's Board of Directors (Mr. Robert D. Collier, Executive Director) for its cooperation with the surveys.

Third, many people offered help of one type or another. One of

the most helpful was Mr. Price Gibson, President of Price Gibson & Associates, Inc., who piloted in a midwest manufacturing company the four instruments we developed to measure the impact of quality circles. The feedback of PG&A on the instruments was of considerable value. Others who offered assistance to the project included: W. S. Rieker (President, Quality Control Circles, Inc.), J. F. Beardsley (President, J. F. Beardsley & Associates), Yvonne Horvath (American Society for Quality Control), Carol Ann Meares (Productivity Information Center, U.S. Department of Commerce), Roger W. Berger (Dept. of Industrial Engineering, Iowa State University), Cynthia C. Rubino (Work in America Institute, Inc.), Michael J. Cleary (Wright State University), Ronald J. Richard (Dunego/Endevco), Davida M. Amsden, Clover Carroll Taylor (Sperry Marine Systems), Robert E. Cole (Center for Japanese Studies, University of Michigan), Robert P. Steel (Air Force Institute of Technology, Wright-Patterson AFB), Michael Maccoby (Project on Technology, Work, and Character), Robin L. Witten (American Center for the Quality of Work Life), Pat Hord (International Labor Office), Robert M. Colton (National Science Foundation), C. Philip Alexander (President, Ann Arbor Consulting Associates, Inc.), Vernon G. Talbott (Institute of Labor and Industrial Relations, Quality of Working Life), Robert Fischer (Hawaii Chapter, IAQC), Edward E. Shore (Human Factor Consulting), Wm. R. Cutter (Nichols-Homeshield, Inc.), Bruce Pester (Standard Plastic Products, Inc.), L. Dean Trump (Hercules Incorporated), Alan L. Roehrig (Allis-Chalmers), Niel Rand (Ann Arbor Consulting Group), John P. Baratiak, Jr. (Santa Barbara Research Center), Charles C. Lozar (Architects Equity Inc.), Warren E. Norquist (Polaroid

Corporation), Joseph D. Schott (Sundstrand Data Control, Inc.), and the Japanese Chamber of Commerce (Chicago).

Most especially, the contributions of the IRD research team need to be mentioned. Assisting Dr. Edward C. P. Stewart in gathering the data from Japan were Miss Lidia Reiko Usami, Mr. James L. Fahey, Miss Sophie Tang, and especially Miss Ikuko Handa (all four from International Christian University, Tokyo), and Professor Robert J. Ballon (Director of the International Management Development Seminars, Sophia University, Tokyo). Assisting Dr. Joyce A. Sween in the data analysis back in Illinois was Mr. Alan Seelye-James. Dr. Jacqueline Howell Wasilewski was chiefly responsible for identifying the "sources of variance" which constituted the parameters of the original test instruments. Dr. C. Srinivasan reviewed for IRD the literature on previous evaluations of quality circles. Mr. Lynn Owens, Dr. Muneko Yoshikawa, and Mrs. Motoko Critenden all provided needed professional services to this project. The members of an expert panel that contributed to the research effort are identified individually in Chapter 1.

Finally, appreciation is due to Dr. Robert Hayles, this project's scientific officer at the Office of Naval Research for his active assistance and encouragement during the conduct of this feasibility study.

Chapter 1:

ESSENTIAL COMPONENTS OF SUCCESSFUL U.S. QUALITY CIRCLES

Objective. To identify the components or conditions that tend to be associated with successful quality circles in U.S. industry.

Methodology. In this chapter, two approaches were employed to identify parsimoniously those characteristics which tend to be associated with U.S. quality circles which experts judge to be successful. In addition to the identification of successful U.S. quality circles presented here, Chapter 5 presents an analysis of the components of successful Japanese quality control circles.

The first approach used in this chapter to identify characteristics associated with successful U.S. quality circles convened a panel of 10 U.S. experts on quality circles. These experts rated the importance of a large number of selected variables in terms of their importance to the success of quality circles. Two sets of variables were rated. The first set consisted of variables which an IRD literature review suggested might contribute to the success of quality circles. The second set of variables which the Expert Panel rated included more IRD-selected variables along with additional variables suggested by comments provided by the panel as part of their response to the first set. Overall, a total of 66 variables were rated by the panel.

The second approach used in this chapter to identify characteristics associated with successful U.S. quality circles was based on an IRD survey of readers of The Quality Circles Journal, the official publication of the International Association of Quality

Circles. This survey appeared as a detachable, two-page questionnaire at the back of the May 1982 issue of the Journal (see Appendix B). A key item in the questionnaire elicited the respondents' self ratings (on a scale of 1-5) of the average success of the quality circles at the respondent's work site. Responses to the variables of the questionnaire were entered in a discriminant analysis to determine to what extent each variable was a predictor of successful quality circles.

FINDINGS

Results from Expert Panel. The Expert Panel consisted of individuals who were academic specialists who had published widely on the subject of quality circles or who were top consultants on implementing quality circles in U.S. industry. The following experts were members of the panel: Dr. Michael J. Cleary (Managing Partner, Productivity-Quality Associates), Dr. Robert E. Cole (Director, Center for Japanese Studies, University of Michigan), Robert D. Collier (Executive Director, International Association of Quality Circles), Donald L. Dewar (President, Quality Circle Institute), Price Gibson (President, Price Gibson & Associates, Inc.), Dr. Frank M. Gryna, Jr. (Professor, Department of Industrial Engineering, Bradley University), Sud Ingle (President, Quality Circles Services), Wayne S. Rieker (President, Quality Control Circles, Inc.), Dr. Philip C. Thompson (Systems Refinement Teams Coordinator, Martin Marietta Aerospace, Michoud Division), and Tom Towner (Senior Associate, Price Gibson & Associates, Inc.). The rating scale utilized was: 1 = not important, 2 = some importance, 3 = important,

4 = very important, 5 = critical importance.

Seven of the 15 conditions that the panel rated most important deal with the level of support within an organization for the quality circles process. The one condition rated by the panel to be the most important was whether participation in the circles process was voluntary (a rating of 4.8 out of a possible 5.0), and there was more agreement among the panel on this than on any other single condition that was rated as of at least some importance. Support for the circles process includes, in order of rated importance, top management (4.7), first-line supervisors (4.7), middle management (4.6), employees (4.3), and unions in those settings where the employees are so organized (4.1).

Five of the 15 conditions rated most important deal with training. Specifically mentioned were the involvement of middle management in the circles process (4.6 out of a possible 5.0), management in general (4.2), the number of hours of training an individual receives (4.0), and whether training includes all levels of employees in the organization (4.0). The organization's overall commitment to "people building" was rated as very important (4.1).

Two other conditions were rated especially important: whether employees have been given a guarantee that no employee would lose their job due to circle actions (4.4) and whether the rules and objectives of the circles program are stated, including topics such as wages that will not be allowed (4.4). This suggests that lowering employee anxiety and confusion are first-order considerations in successful circle programs.

The issues that are highlighted in the discussion above appear

again throughout the many other conditions that were rated less highly but were still rated as important (see Table 1).

On the other end of the continuum, 12 conditions were rated by the panel as having little importance to the success of quality circles. Most of these conditions dealt with the demographic characteristics of the employees or of the work-site. These employee-related characteristics were sex (1.1), job level (blue- or white-collar)(1.4), race (1.6), education (1.9), and personality (1.9). The unimportant characteristics relating to the work site were geographic location (1.1), whether the organization is U.S. or non-U.S. owned (1.3), whether the work site is union or non-union (1.4), type of business (1.6), and the number of employees at the work site (1.7).

Surprisingly, two other conditions were rated as of little importance: the existence of management circles (1.8) and the presence of economic incentives for the circles (1.8). However, holding management responsible for the success of the circles and the presence of social recognition for the circles were both rated as important (3.9 and 3.8, respectively).

The characteristics of variability and central tendency of the ratings of 66 variables by the Expert Panel are presented in Table 1. The components of successful quality circles are presented in order of importance, from most to least important. In those cases where several components were given the same mean rating, they were ranked in order of panel agreement from least to most variance; the lower the variance, the higher the agreement among the raters.

TABLE 1

THE IMPORTANCE OF SELECTED CONDITIONS TO THE SUCCESS OF QUALITY CIRCLES,
 AS RATED BY A PANEL OF TEN EXPERTS:
 Characteristics of Variability and Central Tendency

<u>Conditions</u>	<u>Mean</u>	<u>SD</u>	<u>Variance</u>
1. Voluntary participation	4.8	.42	.16
2. Top management support	4.7	.48	.21
3. Support of first-line supervisors	4.7	.50	.22
4. Involvement of middle management in the circle process	4.6	.52	.23
5. Middle management support	4.6	.70	.44
6. Guarantee that no employee will lose job due to circle actions	4.4	.88	.69
7. Rules & objectives of circle program are stated, including topics (e.g., wages) that will not be allowed	4.4	.88	.69
8. Employee support	4.3	.95	.81
9. Whether management receives training	4.2	.92	.76
10. Problems associated with strikes	4.1	.64	.36
11. Organization's commitment to "people building"	4.1	.78	.54
12. Ability to adjust the classic Japanese concept of quality circles	4.1	1.05	.99
13. Union support	4.1	1.10	1.09
14. Hours of training in quality circle techniques	4.0	.67	.40
15. Training for all level of plant/office employees	4.0	1.12	1.11
16. Leadership style of circle leader	3.9	.74	.49
17. Good organizational communications	3.9	.78	.54
18. Problems associated with loss of a large number of circle members	3.9	.84	.61

<u>Conditions</u>	<u>Mean</u>	<u>SD</u>	<u>Variance</u>
19. Holding management responsible for the success of the circle process	3.9	1.05	.99
20. Continued training for circle members	3.9	1.05	.99
21. Presence of social recognition for circles	3.8	.79	.56
22. Leader & facilitator training in group dynamics	3.8	.92	.76
23. Union involvement in planning & implementation	3.8	1.23	1.36
24. Setting goals prior to the initiation of the circle process	3.8	1.30	1.51
25. Assessment of organizational readiness	3.8	1.32	1.56
26. Problems associated with lay offs	3.7	.71	.44
27. Leader & facilitator training in methods of statistical quality control	3.7	.95	.81
28. Use of research-based training materials	3.7	1.12	1.11
29. Continued training for everyone in any way connected with the circle program	3.6	1.13	1.14
30. A steering committee	3.6	1.24	1.36
31. Scheduled frequency of circle meetings	3.3	.82	.61
32. Percent of workforce at the plant/office that is involved in the circle program	3.3	1.0	.89
33. Problems associated with loss of a facilitator/coordinator	3.3	1.04	.94
34. Problems associated with loss of a team leader	3.3	1.16	1.19
35. Financial stability of organization	3.2	.83	.62
36. Whether company plans to expand circle program	3.2	.97	.84
37. Measurement of economic returns to organization	3.2	1.14	1.16
38. Support of outside consultants in training	3.2	1.40	1.76

<u>Conditions</u>	<u>Mean</u>	<u>SD</u>	<u>Variance</u>
39. Measurement of changes in attitudes	3.1	.88	.69
40. Establishing a budget for the circles	3.1	1.27	1.43
41. Problems associated with loss of a program administrator	3.1	1.36	1.61
42. Initiating circles as part of a broader quality of work life effort	3.0	1.22	1.33
43. A steering committee that is composed of representatives of different levels within the plant/office	3.0	1.58	2.22
44. Circle members all speak the same language	2.9	.78	.54
45. Support of outside consultants in evaluation	2.9	1.37	1.69
46. Creating a circle meeting room	2.8	.83	.62
47. Rotation of new team members into an established problem-solving team	2.8	1.09	1.06
48. Support of outside consultants in planning	2.8	1.23	1.36
49. Head of circle program is located above all functional departments such as Personnel or Quality	2.8	1.39	1.73
50. Full-time facilitator	2.8	1.40	1.76
51. Number of circle members	2.6	.84	.64
52. Tie-in of circles to organization's suggestion program	2.1	.74	.49
53. Ability to adhere to the classic Japanese concept of quality circles	2.1	1.05	.99
54. Providing tangible recognition items (badges, T-shirts, etc.) to circle members	2.1	1.05	.99
55. Circle members have harmonious personalities	1.9	.74	.49
56. Educational level of circle members	1.9	.74	.49
57. Presence of economic incentives for circles	1.8	1.03	.96

<u>Conditions</u>	<u>Mean</u>	<u>SD</u>	<u>Variance</u>
58. Existence of management circles	1.8	1.23	1.36
59. Number of employees at facility	1.7	.48	.21
60. Circle members are racially homogeneous	1.6	.70	.44
61. Type of industry	1.6	.84	.64
62. Whether circle members are blue- or white-collar	1.5	.97	.85
63. Whether plant/office is union or non-union	1.4	.73	.47
64. Whether company is U.S.-owned or Japanese-owned	1.3	.67	.41
65. Circle members are of the same sex	1.1	.32	.09
66. Geographic location of facility	1.1	.32	.09

Results from IRD Survey (May 1982). The second approach to identifying the variables associated with successful U.S. quality circles involved surveying the readers of the May 1982 issue of The Quality Circles Journal. By June 30, 1982, seven percent, or 211 respondents out of an estimated 3000 U.S. readers of the Journal who are involved in quality circles, returned the survey to IRD.

Thirty-two variables were allowed to enter into the discriminant analysis. Table 2 shows for each variable the means and standard deviations obtained by two groups--Group 1 consists of work sites where the quality circles were assigned high self-ratings of success (72 sites with ratings of 4 or 5), and Group 2 consists of work sites which were assigned average or low ratings of success (46 sites with ratings between 1 and 3). Of the 211 cases that were processed, 93 were excluded from the analysis because they had at least one missing discriminating variable (i.e., these questionnaires had items that were not completed by the respondents). The discriminant analysis used the remaining 118 unweighted cases.

Table 3 shows the 14 variables that met the discriminant program's criterion for entry. The variables are shown in the order for which they account for most variance between the two groups: sites with highly successful quality circles and sites with quality circles that were not rated as highly successful.

TABLE 2
VARIABLES LOADED INTO DISCRIMINANT ANALYSIS:
CHARACTERISTICS OF VARIABILITY AND CENTRAL TENDENCY BY GROUP

Variables	Average Success or Less		Highly Successful Circles	
	mean	SD	mean	SD
1. DCOSTEF	.48	.50	.85	.36
2. CRISES	3.26	1.04	3.74	.80
3. VOLFAC	.61	.49	.82	.38
4. USOWN	.81	.40	.91	.30
5. CIRC11	.08	.23	.01	.12
6. MEASSAV	3.06	1.06	3.72	1.06
7. HOURS	2.63	.97	3.10	1.23
8. BUS18	.07	.26	.04	.20
9. BUS3	.02	.15	.08	.28
10. CIRC19	.02	.15	.07	.26
11. CIRC8	.15	.36	.25	.44
12. DUNIONQL	.54	.50	.61	.49
13. QUALN	6.59	5.23	10.12	8.43
14. MEMN	57.00	46.91	85.50	85.53
15. TIME	1.89	.77	2.03	.75
16. DAVN	.13	.34	.04	.20
17. PERCNT	1.76	.85	1.80	.85
18. ORGSIZE	2.30	.73	2.43	.69
19. EMPN	2.54	.89	2.86	.94
20. DUNION	.56	.50	.62	.49
21. DFACILIT	.49	.50	.58	.50
22. MEET	1.15	.36	1.03	.16
23. VOLLEAD	1.24	.43	1.21	.41
24. CIRC1	.24	.43	.26	.44
25. CIRC3	.11	.31	.07	.25
26. CIRC7	.04	.21	.07	.25
27. CIRC10	.09	.28	.08	.28
28. BUS1	.19	.40	.15	.36
29. BUS8	.19	.40	.18	.39
30. BUS14	.04	.21	.07	.25
31. BUS15	.06	.25	.01	.12
32. HETERO	2.24	1.21	2.49	1.39

TABLE 3
SUMMARY TABLE OF VARIABLES ENTERED INTO DISCRIMINANT ANALYSIS

STEP	ACTION ENTERED REMOVED	VARS IN	WILKS LAMBDA	SIG.	RAD*5 V	SIG.	CHANGE IN V	SIG.
1	DCQSTEF	1	.844792	.0000	21.3114	.0000	21.3114	.0000
2	CRISIS	2	.800782	.0000	28.3584	.0000	7.5469	.0000
3	VOLFAC	3	.768232	.0000	34.9400	.0000	6.1378	.0132
4	USOWR	4	.735907	.0000	41.6289	.0000	6.6382	.0100
5	CIRCL1V	5	.713481	.0000	46.5831	.0000	4.9542	.0260
6	AEASSAV	6	.691931	.0000	51.0457	.0000	4.4626	.0244
7	HOURS	7	.674422	.0000	55.9991	.0000	4.9534	.0370
8	BUS16	8	.660264	.0000	59.6874	.0000	3.6883	.0549
9	CIRCL19	9	.647420	.0000	63.1726	.0000	3.4851	.0619
10	CIRCL8	10	.627782	.0000	65.8774	.0000	2.7047	.1001
11	DUNION	11	.617204	.0000	68.7773	.0000	2.9001	.1706
12	QJALN	12	.612487	.0000	71.3917	.0000	2.6144	.1673
13	MEMN	13	.600181	.0000	73.3917	.0000	2.0034	.1518
14		14		.0000	77.2749	.0000	3.8832	.0468

The most differentiation between the two groups was produced by whether the quality circles were considered by the raters to be cost-effective or not ("DCOSTEF"), with sites that had circles that were judged to be cost-effective linked to highly successful programs. The second most differentiating variable was the extent to which long-term vs. short-term issues were the focus of quality circle attention ("CRISES"). The more long-term the focus, the more highly successful the quality circles programs were rated. While all of the 118 respondents indicated that member participation was voluntary, whether the participation of facilitators was voluntary ("VOLFAC") was the third most important discriminating variable, with voluntary facilitators linked to highly successful programs.

Those respondents whose firms were owned by U.S. firms ("USOWN") tended to have higher ratings of successful quality circles than did firms owned by non-U.S. organizations. The next most discriminating variable was the extent to which firms had all types of personnel participating in the quality circle program ("CIRC11"). This was followed by organizations with a strong tendency to measure the unit savings resulting from circles activity ("MEASSAV").

The number of hours of training was an important predictive variable ("HOURS"). The greater the number of hours, the more likely a rating of success. The last statistically significant variable to enter was the number of employees in a work site that participated in quality circles ("MEMN"), indicating that the more people involved, the more successful the quality circles program tended to be.

All of the above eight variables accounted for a change in Rao' V that was significant at least at the five percent level. Six

additional variables also were entered in the discriminant analysis but the change in Rao's V did not meet this level of statistical significance.

Of the 69 work sites that were considered by the respondents to be of average or less success, 50 sites (72.5%) were predicted to be in that classification on the basis of the discriminating 14 variables.

Of the 135 work sites where the quality circles were rated as highly successful, 97 (71.9%) were predicted to be in that classification on the basis of the 14 discriminating variables.

The overall correct classification predicted by the discriminating variables was 72.06%--a very high level of predictability. These data are presented in Table 4.

Out of the 36 variables entered into the discriminant analysis, 14 of them are sufficient to predict quality circles that were rated highly successful vs. average or below average success. The discriminant analysis, by enabling a reduction of the 36 variables entered, allows us to identify parsimoniously selected variables associated with highly successful quality circles in U.S. industry.

TABLE 4
CLASSIFICATION RESULTS OF DISCRIMINANT ANALYSIS

ACTUAL GROUP		NO. OF CASES	PREDICTED GROUP MEMBERSHIP	
			1	2
GROUP	1	69	50 72.5	19 27.5
GROUP	2	135	38 28.1	97 71.9
UNGROUPE CASES		7	3 42.9	4 57.1

PERCENT OF GROUPE CASES CORRECTLY CLASSIFIED - 72.06

CLASSIFICATION PROCESSING SUMMARY

211 CASES WERE PROCESSED.
211 CASES WERE USED FOR PRINTED OUTPUT.

GROUP 1 = Quality circles of average or less success.

GROUP 2 = Quality circles that are highly successful.

Chapter 1 Conclusions.

1. Expert Ratings. The IRD ratings completed by 10 experts and the self-ratings completed by several hundred practitioners of quality circles succeeded in identifying a brief list of variables important to the success of quality circles. The variables included in the IRD May 1982 survey overlapped somewhat with those included in the longer list of variables which the Expert Panel rated. For the most part, both ratings are quite consistent in the area of overlap.
2. Critical Components. The important variables that need to be probed in measures of quality circles success that emerged from the IRD surveys include the following: broad support within the organization for quality circles, extensive training for those involved in the quality circles program, alleviation of employee fears and confusion concerning the goals of the quality circles, extent to which quality circles gains are measured, extent to which the circles focus on long-term vs. short-term issues, whether the quality circles are cost-effective, and how many employees at the work site participate in the circles program.
3. Most Predictive Variables. Seven variables were found to predict within 74% accuracy whether a quality circle was highly successful. They are the following: whether the

circle is cost-effective, whether it deals with long-range rather than crisis problems, whether the facilitators are voluntary, the extent to which circles measure the cost savings of their recommendations, the total number of employees involved in quality circles at the work site, whether the circle meets at least once a week, and the number of hours of training received by the circle members. (The analyses for this conclusion were made too late for inclusion in this chapter; they will be presented in an article appearing in the May 1983 issue of The Quality Circles Journal.)

Chapter 2:

INCIDENCE OF QUALITY CIRCLES IN U.S. INDUSTRY

Objective. To determine whether a sufficiently wide range of U.S. firms employing quality circles can be identified to make feasible an experimental evaluation of their effectiveness.

Methodology. The information on U.S. quality circles that is presented in this chapter was gathered via two IRD surveys.

The first survey, a one-page questionnaire, was mailed to 3175 U.S. members of the International Association of Quality Circles (IAQC) in March, 1982 (see Appendix A for a copy of the survey form).

The second survey (see Appendix B) was a two-page questionnaire that formed a part of the May 1982 issue of The Quality Circles Journal. This survey was described in the previous chapter.

FINDINGS

FIRST SURVEY. The response rate to the first survey was 26.1%, or 828 completed survey forms. Of these, 3.6%, or 115 respondents, indicated that they currently did not employ quality circles in their organization (many indicated that they planned to initiate a program within several months). The remaining survey information on 713 locations (828 minus 115 = 713) with functioning quality circles is the largest number of U.S. work sites with functioning quality circles identified to date by anyone, and exceeds the number IRD anticipated locating by several hundred.

It was our purpose to identify quality circles from a broad range of U.S. organizations and not to sample representatively the

universe of U.S. business. Our sample of IAQC respondents may or may not be an accurate representation of U.S. industry with functioning quality circles. Fifteen items of information were elicited by the survey. The frequency distributions for the 15 descriptive variables obtained by the first survey on the 713 respondent organizations with functioning quality circles are discussed below.

Number of Work Sites with Quality Circles. Each of the 713 respondents identified an average of 2.2 plants with functioning quality circles. The total number of plants so identified was 1,572; the range was 1-90; the mode was 1 (460 respondents reported their organizations had one facility with circles; 107 reported two plants); and a median of 1.0 plants. It should be noted that information on the 15 survey variables was obtained for the most part on the respondents' work site. Hence, the population in this study is the 713 work sites of the respondents instead of the 1,572 locations within the respondents' organizations that were reported by the survey respondents as having quality circles.

Number of Quality Circles in the Reporting Organizations. The survey respondents indicated that their organizations had 12,424 quality circles. The number of circles in any one organization ranged between one and 728, with a mode of 4 (69 respondents reported working in locations with four circles), and a median number of 6.5 circles.

Number of Quality Circles by Type (Blue-Collar, White-Collar, Managerial) in the Reporting Organizations. Respondents were asked whether the quality circles in their organization included blue-collar, white-collar, and/or management circles. The responses

to this item are summarized in Table 5. The largest number of respondents (47% or 323 respondents) reported a combination of both blue- and white-collar quality circles. The next largest group (31% or 210 respondents) reported blue-collar circles only. The third largest group of respondents (22% or 152 respondents) reported a combination of all three types of quality circles: blue-collar, white-collar, and managerial. Managerial circles were the least frequently reported.

TABLE 5

QUALITY CIRCLES BY PERSONNEL TYPE:
Characteristics of Variability and Central Tendency

	N	Mean	SD
1. Blue-collar only	210	6.27	6.78
2. White-collar only	70	8.94	8.86
3. Management only	4	7.75	5.85
4. Blue- and white-collar	232	18.15	33.16
5. Blue-collar & managerial	24	8.29	5.97
6. Blue-, white-collar, managerial	152	36.92	98.35
7. White-collar, managerial	11	22.45	36.68

N = 703

Size of Organization. Respondents were asked to indicate whether their organization was small, medium or large. Due to the industry differences that determine the size of an organization relative to other organizations in the same business, it was thought that this self rating would yield a more accurate view of the firm's relative size than would information on the number of employees in the organization. The respondents indicated they worked in small (20.4%), medium sized (47.1%), and large (32.5%) organizations.

Relation of Number of Quality Circles and Size of Organization. As would be expected, the smaller organizations were more likely than medium or large organizations to have between one and three quality circles. Organizations having between four and 10 quality circles were not differentiated by size. While small organizations were the least likely to have between 11-20 quality circles, medium sized organizations were the most likely to have this range of quality circles. The larger organizations were the most likely to have over 20 quality circles. Table 6 presents these data.

TABLE 6
RELATION OF NUMBER OF QUALITY CIRCLES AND SIZE OF WORK SITE

No. of Circles	Size of Organization		
	small	medium	large
1. Between 1-3 circles	41.0%	19.2%	9.9%
2. 4-10 circles	44.2	47.3	33.9
3. 11-20 circles	10.2	24.9	19.2
4. Over 20 circles	4.6	8.6	37.0

N = 711

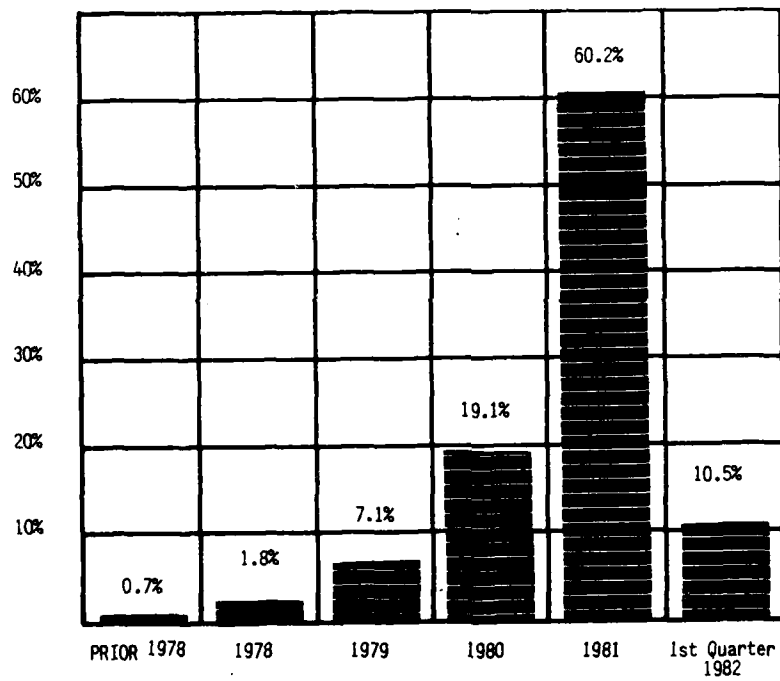
Year Quality Circles Initiated in Reporting Organizations.

Figure 1 graphically displays by percentage the year the respondents reported that their organizations began their quality circles program. It is immediately apparent that few organizations were reported which began their circle program prior to 1979, but the increase since 1979 has been dramatic.

A trend analysis, based on the four-year period of 1978-1981, estimates the probable number of organizations that might initiate a circle program in 1982 to be 492. (It should be remembered that this estimate is based on our sample of 713 reporting organizations and is not extrapolated to the universe of U.S. businesses with functioning quality circles.) A second trend analysis on the percentages of quality circles initiated in each of the same four-year period estimated the mathematically probable percent of quality circles that will have their birth dates in 1982 to be 69.5% of the total number of quality circles operating by the end of 1982. These trend analyses offer conservative estimates. To extrapolate speculatively to the universe of U.S. organizations with functioning quality circles, a factor of four appears reasonable and conservative. That is, one could multiply our sample responses by four to get a "guesstimate" of the incidence of quality circles nationwide.

Figure 1

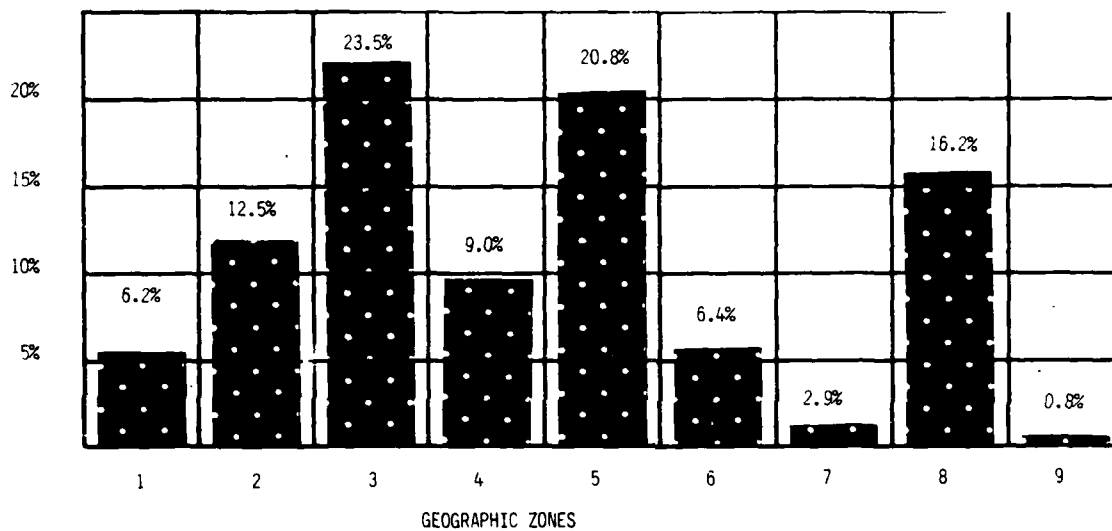
PERCENTAGE OF ORGANIZATIONS THAT INITIATED
A QUALITY CIRCLES PROGRAM BY YEAR OF PROGRAM INITIATION (N=713)



Geographic Distribution. We divided the U.S. into nine regions. The 713 respondents were spread over these regions in the following pattern: 1. New England (CT, ME, MA, NH, RI, VT): 6.2%, or 45 respondents; 2. Middle Atlantic (DE, DC, MD, NJ, NY, PA): 12.5%, or 90 respondents; 3. East North Central (IL, IN, MI, OH, WI): 23.5%, or 170 respondents; 4. West North Central (IA, KS, MN, MO, NE, ND, SD): 9.0%, or 65 respondents; 5. South (AL, FL, GA, KY, MS, NC, SC, TN, VA, WV): 20.8%, or 150 respondents; 6. South Central (AR, LA, OK, TX): 6.4%, or 46 respondents; 7. Mountain (AZ, CO, ID, MT, NV, NM, UT, WY): 2.9%, or 21 respondents; 8. West (CA, OR, WA): 16.2%, or 117 respondents; 9. Alaska and Hawaii: 0.8%, or 6 respondents. Figure 2 portrays these regional distributions more visually.

Figure 2

PERCENTAGE OF ORGANIZATIONS WITH QUALITY CIRCLES
BY GEOGRAPHIC REGION (N=710)



- Zone 1. New England
2. Middle Atlantic
3. East North Central
4. West North Central
5. South
6. South Central
7. Mountain
8. West
9. Alaska & Hawaii

Willingness to Participate in Evaluation. Respondents indicated whether they were willing to have IRD evaluate the effectiveness of their quality circles in the event DoD funded Phase II research. Forty-six percent (331 respondents) responded "yes," 46% (329) indicated "perhaps," and 8% (59) said "no." From unsolicited comments written on the survey form, many of those who said "perhaps" wanted to have more details. A number of the respondents who answered negatively to this item indicated that they felt it was too soon to evaluate their quality circles program. If we combine the "yes" and "perhaps" responses, there are 656 organizations likely to participate in a Phase II study.

Do the characteristics of these three groups (i.e., the "yes" group, the "perhaps" group, and the "no" group) differ along the dimensions queried by the survey? To answer this question, the 15 polled variables were allowed to enter into a discriminant analysis. Of these 15 variables, eight met the program's criterion for entrance in the discriminant function. Of these eight, five variables produced a statistically significant change ($p < .05$) in Rao's V. Namely, organizations with a combination of blue-collar and managerial quality circles, or a combination of blue- and white-collar quality circles, or organizations with just blue-collar quality circles; East North Central locations; and the total number of quality circles in an organization.

Table 7 presents a summary of the contributions made by the eight variables that met the program's criterion for entrance, and Table 8 presents the standardized canonical discriminant function coefficients of these eight variables. An examination of this

analysis indicates that the larger the number of quality circles, the more likely an organization is to be willing to participate in a Phase II study. Also more likely to participate are organizations located in the East North Central part of the U.S., and organizations that have a combination of blue-collar and managerial, or blue- and white-collar, quality circles.

TABLE 7
SUMMARY TABLE OF VARIABLES ENTERED INTO DISCRIMINANT ANALYSIS

STEP	ENTERED	ACTION REMOVED	VARS IN	WILKS LAMBDA	SIG.	RAC+S V	SIG.	CHANGE IN V	SIG.
1	BLUMAN		1	.985603	.0364	10.1686	.0023	13.1888	.0062
2	ENCEN		2	.974773	.0014	17.9324	.0013	17.7858	.0204
3	BLUWHT		3	.959973	.0007	23.7034	.0003	23.7333	.0363
4	BLUE		4	.959114	.0003	29.5238	.0001	29.8182	.0545
5	QCS		5	.959132	.0001	36.1848	.0001	36.6352	.0362
6	SOUTH		6	.943193	.0001	41.4763	.0001	41.9398	.0370
7	MIDAT		7	.939529	.0001	44.2773	.0001	44.7950	.0467
8	SIZE		8	.936073	.0001	46.9634	.0001	47.6861	.0610

1. BLUMAN = Organization has a combination of blue-collar and managerial quality circles.
2. ENCEN = East North Central location.
3. BLUWHT = Combination of blue-collar and white-collar quality circles.
4. BLUE = Organization has quality circles only for blue-collar workers.
5. QCS = Number of functioning quality circles.
6. SOUTH = Southern location.
7. MIDAT = Mid Atlantic location.
8. SIZE = Size of the organization.

TABLE 8
STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1	FUNC 2
OCS	-.17363	-.07936
BLUE	-.03357	-.03357
BLUWHY	-.07612	-.03357
BLUMAN	-.00927	-.03357
SIZE	-.37363	-.03357
MIDAT	-.03357	-.03357
ENCEN	-.03357	-.03357
SOUTH	-.03357	-.03357

CANONICAL DISCRIMINANT FUNCTIONS EVALUATED
AT GROUP MEANS (GROUP CENTROIDS)

GROUP	FUNC 1	FUNC 2
1	.20558	.07198
2	-.10973	-.12263
3	-.57836	.28219

Table 9 presents the group membership predicted by the discriminant analysis on the basis of the eight variables. Taken together, the eight variables correctly predict 59% of the "yes" group, 28.6% of the "perhaps" group, and 47.4% of the "no" group. The overall percent of groups correctly classified by these eight variables is 44.2%, substantially less than chance would predict. Therefore, there is little basis for differentiating among these three groups on the basis of the variables measured by the March 1982 survey.

TABLE 9
CLASSIFICATION RESULTS OF DISCRIMINANT ANALYSIS

ACTUAL GROUP		NO. OF CASES	PREDICTED GROUP MEMBERSHIP		
			1	2	3
GROUP	1	329	194 59.0	64 19.5	71 21.6
GROUP	2	315	139 42.8	93 28.6	83 25.5
GROUP	3	57	19 33.3	11 19.3	27 47.4
UNGROUPED CASES		1	1 100.0	0	0

PERCENT OF GROUPED CASES CORRECTLY CLASSIFIED = 44.16

CLASSIFICATION PROCESSING SUMMARY

722 CASES WERE PROCESSED.
13 CASES HAD AT LEAST ONE MISSING DISCRIMINATING VARIABLE.
712 CASES WERE USED FOR PRINTED OUTPUT.

GROUP 1 = Respondents who said "yes" to a future IRD evaluation.

GROUP 2 = Respondents who said "perhaps."

GROUP 3 = Respondents who said "no."

SECOND SURVEY. The information provided by the 211 Journal readers who responded to the second survey by June 30, 1982, enable a fuller understanding of the characteristics of U.S. quality circles than that provided by the first survey.

Year of Program Initiation. Sixty percent (118 work sites) of the respondents to the second survey indicated they began their quality circles in 1981 and 26% (56 sites) indicated they began them during the current partial year of 1982. Only 1.4% (3 sites) of the respondents began their quality circles prior to 1979. While recent subscribers to the Journal may have been more prone to respond to the survey, the numbers of organizations other surveys have reported as initiating their circles program prior to 1979 are consistent with the IRD surveys. Quality circles in U.S. industry is a recent phenomenon.

Number of Quality Circles. The 210 respondents who reported the number of quality circles at their work site reported between one and 400 circles, with a mode of four and an average of 12.9 circles. Most respondents (75.2%) reported between one and 12 quality circles at their work site. The average number of employees involved in these circles at any one work site was 97, with a median number of 54.7 and a mode of 40.

Size of Quality Circles. The vast majority of respondents (89%) reported that the average number of members in each of their quality circles was between five and 10. Ten percent of the respondents indicated that their circles averaged between 11 and 15 members.

Name of Work Groups. Most of the 211 respondents (74.2%) to

the second survey indicated they called their program "quality circles." The second most popular name was "quality control circles" (2.4%); 23.4% called them something other than quality circles or quality control circles. The words "circle" and "quality" generally appeared somewhere in the name of the circles in the "other" category.

Percent of Workforce Belonging to Quality Circles. Respondents were asked for the approximate percentage of all the employees at their work sites who belonged to quality circles. Forty-five percent of those respondents answering this item indicated that less than 10% of their workforce participated in the circles program. Forty percent of the respondents indicated that between 11% and 25% of their workforce participated; 10% indicated that between 26% to 50% of the workforce belonged to quality circles. Only four percent of the respondents indicated that more than 50% of their workforce participated in a quality circles program.

Type of Quality Circle. What level of employee participates in quality circles? The survey respondents reported that 25.6% of their circle programs solely involved blue-collar workers, 7.6% of the work sites solely involved white-collar employees, and 18% of the work sites had a combination of blue- and white-collar participants in their quality circles program. Many other combinations also were reported. These included: blue-collar and foremen (6.6%); blue-, white-collar, and professionals/engineers (8.1%); blue-, white-collar, foremen/supervisors, professional/engineers, middle management, upper management (5.7%); blue- and white-collar, and foremen/supervisors (5.7%); white-collar and professional/engineers (3.3%).

Type of Business. The survey respondents were engaged in 30 different types of business, excluding a catch-all category of "other" in which 20.5% of the respondents fell. Table 11 presents these results.

TABLE 11

TYPE OF BUSINESS ENGAGED IN
BY RESPONDENT ORGANIZATIONS

1. Metals and/or fabricated products	18.7%
2. Other manufacturing	18.7
3. Electronics and/or computers	12.9
4. Government (local, state, federal)	5.7
5. Chemical, petroleum, mining, rubber	4.8
6. Financial and/or insurance	4.3
7. Armed forces	4.3
8. Machinery	3.3
9. Paper and/or wood products	2.9
10. Textile and/or apparel	1.9
11. Transportation	1.4
12. Food and kindred products	1.4
13. Publishing and/or printing	1.0
14. Retailing	1.0
15. Education	0.5
16. Other	20.5

Ownership of Reporting Organizations. Of the 207 respondents who indicated whether their organization was U.S.-owned or not, 85.5% were totally U.S.-owned, 1.4% were partly U.S.-owned, and 13% were not U.S.-owned.

Organizations' Size. Respondents indicated whether they considered their "total corporate organization" to be small, medium or large. Small organizations accounted for 14.4% of the 209 responses that had this item completed, 39.7% were from medium-sized organizations, and 45.9% represented large organizations. Respondents additionally were asked how many employees there were at the respondents' work sites. Of the 208 returned questionnaires that responded to this item, 6.7% of the sites employed under 100 employees, 39.4% employed between 100 and 500 employees, 26% employed between 501 and 1000 employees, and 27.4% of the work sites had over 1000 employees.

Union or Non-Union Work Sites. About half the respondents reported their sites had a union (49% with union, 51% without). In those sites with a union, 57.7% of the respondents indicated that union members participated in the quality circles.

Full-Time Facilitators. Almost half (48.1% or 101 sites) of the 210 respondents who completed this item indicated they had full-time facilitators for their quality circles; another 8.1% (17 sites) had both full- and part-time facilitators. There were part-time facilitators reported in 42.8% (90 sites) of the sites. Only one percent (2 sites) reported that they did not employ facilitators.

Frequency of Circle Meetings. The vast majority (90% or 188 sites) of the respondents reported that their circles met "at least once a week." Circles meeting once or twice a month constituted 8.6% (18 sites) of the responses. Only one percent (2 sites) reported that their circles met "as needed, generally less than once a month."

Amount of Training. Respondents were asked to indicate approximately how many hours of initial and follow-up training the average quality circle member had received. Of the 208 respondents who completed this item, 11.5% (24 sites) indicated that the circle members received less than five hours of training. Sites reporting between five and eight hours of training accounted for 29.8% (62 sites) of the total. The largest portion of respondents reported between nine and 12 hours of training. Only two percent of the respondents reported more than an average of 25 hours. Table 12 presents these results.

TABLE 12
HOURS OF TRAINING RECEIVED BY AVERAGE QUALITY CIRCLE MEMBER

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1. 0-4 hours of training	1.	24	11.4	11.5	11.5
2. 5-8 hours	2.	62	29.4	29.8	41.3
3. 9-12 hours	3.	91	43.1	43.8	85.1
4. 13-16 hours	4.	15	7.1	7.2	92.3
5. 17-25 hours	5.	12	5.7	5.8	98.1
6. 26-35 hours	6.	2	.9	1.0	99.0
7. Over 36 hours	7.	2	.9	1.0	100.0
BLANK		3	1.4	MISSING	
TOTAL		211	100.0	100.0	

Voluntary vs. Non-Voluntary Participation. The majority of leaders (80%) and facilitators (73%) are reported to participate voluntarily in the quality circles program. Virtually all (99.5%) of the respondents reported that circle members participate voluntarily. Table 13 presents these results.

TABLE 13
ORGANIZATIONS WITH VOLUNTARY PARTICIPATION
IN QUALITY CIRCLES: LEADERS, FACILITATORS, MEMBERS

	Voluntary		Non-Voluntary	
	Percent	No. Sites	Percent	No. Sites
Leaders (N=209)	79.9%	167	19.1%	42
Facilitators (N=202)	72.8	147	27.2	55
Members (N=211)	99.5	210	0.5	1

Heterogeneity of Circle Members. All respondents rated on a scale of 1 to 5 the extent to which their quality circles were composed of people of similar ethnic and linguistic backgrounds. A rating of 1 indicated very similar backgrounds and a rating of 5 indicated very mixed backgrounds. On the average, the respondents reported a rather homogeneous membership, with a mean rating of 2.5 out of 5. Most respondents (55.4%) rated the personnel makeup of their sites' quality circles as having similar backgrounds (a rating of 1 or 2 out of 5). Only 24.2% rated them as being of quite mixed backgrounds (a rating of 4 or 5). A fifth (20.4%) of the respondents rated the backgrounds of circle members to be the middle ranking "3".

Short-Term vs. Long-Range Focus. Respondents were asked the extent to which their quality circles are a way to handle short-term crises rather than of implementing long-term change. The average rating was 3.6, indicating that most of the 206 respondents to this item thought the focus of their circles was on a medium- to long-term. Only 8.8% (18 sites) indicated a short-range focus (a rating of 1 or 2 out of a possible 5). On the other hand, 60.2% (124 sites) indicated a long-range focus (a rating of 4 or 5). Almost of third (31.1% or 64 sites) of the respondents indicated a medium rating of 3.

Time Before Becoming Cost-Effective. The survey asked how long the quality circles at the respondents' work sites generally operate "before they begin saving your organization money in excess of costs." Of the 196 respondents completing this item, 21.4% (42 sites) indicated "6 months or less," 29.6% (58 sites) indicated between 7-12

months, 13.3% (26 sites) said within one year, 4.6% (9 sites) indicated they became cost effective within two years, and 31.1% (61 sites) said that their quality circles were not yet cost effective. Many of this latter group were in organizations that had only initiated their circles program within the previous six months.

Another item asked "To what extent do your quality circles measure the unit savings resulting from circle activity (cost reductions/reduced scrap rates, etc.)?" The average rating (N=199) on a scale of 1 ("never") to 5 ("always") was 3.4. Sixteen percent of the respondents rated this item a low 1 or 2, while 45.2% rated it a high 4 or 5; 38.7% of the respondents gave the item an average rating of 3.

Overall Success. The average rating of quality circles success at the respondents' work sites (N=204), on a scale of 1 ("mostly failures") to 5 ("very successful"), was 3.8. Only 1.5% (or three sites) rated themselves poorly. About a third (32.4% or 66 sites) rated themselves as average. On the other hand, 66.2% rated themselves as quite successful (a rating of 4 or 5).

Anticipated Increase in Quality Circles. Asked how much they anticipated quality circles would increase at their work sites over the next two years, the respondents (N=211) anticipated quite a bit of expansion. Fifty-three percent of the respondents thought that the number of circles at their site would double or more over the next two years, and 39.4% thought they would expand by 11% to 99%. Table 14 presents these results.

TABLE 14
 ANTICIPATED INCREASE IN QUALITY CIRCLES AT RESPONDENTS' SITES OVER NEXT TWO YEARS

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1. Reduced by more than 10%	1.	6	2.8	2.8	2.8
2. Remaining at current level	2.	10	4.7	4.7	7.6
3. Increased by 11%-50%	3.	62	29.4	29.4	37.0
4. Increased by 51%-99%	4.	21	10.0	10.3	46.9
5. Doubled in number	5.	29	13.7	13.7	63.7
6. Tripled in number	6.	42	19.9	19.9	80.6
7. More than tripled	7.	41	19.4	19.4	100.0
TOTAL		211	100.0	100.0	

Chapter 2 Conclusions.

1. Range. The range of organizations identified through the IRD surveys appears to be sufficiently broad to satisfy the research objective of identifying a cross-section of U.S. organizations with functioning quality circles that can form a pool from which to draw a Phase II sample.
2. Overall Number. The overall number of identified organizations (719) appears to be large enough to apply standard techniques for identifying a parsimonious sample size within reasonable error limits.
3. Willingness to Participate. The vast majority of surveyed organizations indicate a willingness to participate in a Phase II evaluation, and the characteristics of willing organizations are not substantially different from organizations that were not willing to participate.

Chapter 3:
EXPERIMENTAL RESEARCH DESIGN
FOR
EVALUATING THE IMPACT OF QUALITY CIRCLES

Objective. To develop an experimental research design for Phase II to measure the impact of quality circles that takes cognizance of the configurations of quality circles in U.S. industry.

Methodology. Through two separate surveys of U.S. industry (see Chapters 1 and 2) IRD identified a large representative sample of U.S. industry with functioning quality circles. Of this sample, 331 organizations said "yes" and 329 organizations said "perhaps" to the question of whether they were willing to participate in Phase II research. IRD then performed a discriminant analysis to determine if organizations that said "yes" could be distinguished from organizations who answered "perhaps" (see previous chapter). None of the 15 variables polled in the March 1982 IRD survey distinguished these two groups. Therefore, we collapsed these two categories of organizations that have the potential for being involved in the Phase II research. The population for Phase II research would be, then, the 656 locations that constitute the two collapsed categories of respondents that were open to possible future involvement in quality circle research. IRD had previously determined through a discriminant analysis that the group of organizations (59) that responded "no" to involvement in Phase II research did not differ substantially from organizations who were willing to consider further involvement.

Table 15 presents a correlation matrix of the 15 variables

identified from the March 1961 IRD survey. While many of the correlations are low, certain variables indicate high correlations. An examination of this matrix shows that some variables are more closely linked than others.

Therefore, it was thought advisable to identify the underlying dimensions of the 15 variables in order to economize the dimensions across which to draw the Phase II sample. To this end, we performed a factor analysis (varimax rotated factor matrix based on a principal components method). The results of this analysis are presented in Table 16. Three underlying dimensions were identified: size, location, and type of quality circle group. Number of quality circles and number of locations with quality circles within a given organization both had high loadings on Factor 1 (size); a southern location loaded positively on Factor 2 (location); and blue-collar quality circles were positively correlated with Factor 3 (type of quality circle).

TABLE 16
VARIMAX ROTATED FACTOR MATRIX
AFTER ROTATION WITH KAISER NORMALIZATION

	FACTOR 1	FACTOR 2	FACTOR 3
YEARS	.37235	.175	-.13837
QCS	.95714	.000	-.000
PLANTS	.83302	.000	-.000
BLUE	.000	.000	.000
WHITE	.000	.000	.000
BLUWHT	.000	.000	.000
BLUMAN	.000	.000	.000
STINGS	.27785	.000	.000
NEWENG	.000	.000	.000
MICAT	.000	.000	.000
ENCEN	.000	.000	.000
WNCEN	.000	.000	.000
SOUTH	.000	.000	.000
MOUNT	.000	.000	.000
WEST	.000	.000	.000

FACTOR 1 = size of quality circle.

FACTOR 2 = geographic location of quality circle.

FACTOR 3 = type of quality circle (e.g., blue-collar)

Each of the 656 organizations comprising the research population received factor scores that were calculated on the basis of the three identified factors. From the distributions of these factor scores, the median was obtained for each of the factors. Organizations were assigned a dichotomized score on each of the factors based on whether their factor score was above or below the median of the factor score distributions on each of the three factors. This median split produces a 2X2X2 factorial design across which the Phase II sample can be drawn. This procedure insures representation from the three dimensions that the factor analysis identified as the principal underlying reported characteristics of the respondents' organizations.

Table 17 indicates the number and percent of the locations which are in each of the cells of the 2X2X2 factorial design matrix.

TABLE 17
MEDIAN-SPLIT DISTRIBUTIONS OF FACTOR SCORES

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	000	151	22.8	22.8	22.8
	001	16	2.4	2.4	25.2
	010	144	21.7	21.7	46.9
	011	21	3.2	3.2	50.1
	100	17	2.6	2.6	52.6
	101	148	22.3	22.3	75.0
	110	20	3.0	3.0	78.0
	111	146	22.0	22.0	100.0
	TOTAL	663	100.0	100.0	

CODE = Distribution of factor scores.

First column represents Factor 1 (size);

second column Factor 2 (location);

and third column Factor 3 (type of quality circle).

0 = Responding organization scored below the median in the distribution of factor scores.

1 = Responding organization scored above the median.

To determine the minimum number of work sites to survey so as to be accurate within 30% at a 95% confidence level (within about two standard deviations), we determined within each of the stratification groups (i.e., the eight cells in the factorial design) the subsample size that would yield an acceptable standard error of the estimate. To accomplish this, the following formula was utilized:

$$\hat{s} = \sqrt{(N^2 \sigma^2 / n)(1 - n/N)}$$

where: \hat{s} = the standard error of the estimate

N = the population size

n = the sample size

σ = the population standard deviation (estimated to be 1.5 on 2.5 standard deviations from the mean)

Table 18 presents the results of these calculations. The total number of work sites that this method recommends be surveyed out of the pool of available work sites is 135. Table 18 also indicates the subsample size of each of the eight factor cells.

TABLE 18
CONSIDERATIONS IN THE DETERMINATION OF APPROPRIATE SAMPLE SIZE

Factor Cells*	No. Sites in Factor Cell	Estimated SD	Required Sample Size	SE of Estimate of Sample
000	151	45.3	25	44.4
001	16	4.8	10	4.6
010	144	43.2	22	42.4
011	21	6.3	13	6.2
100	17	5.1	10	5.1
101	148	44.4	22	43.6
110	20	6.0	11	6.0
111	146	43.8	22	43.0

* The code for the factor cells is described in Table 17.

Chapter 3 Conclusions.

1. Research Design. A 2X2X2 factorial design matrix provides an appropriate fit to the incidence characteristics of U.S. work sites with functioning quality circles.
2. Sample Size. An adequate overall sample size for the combined factor cells for Phase II research is 135. This number is large enough to provide reasonable error limits and it is small enough to offer a viable Phase II sample size.
3. Subsample Size. A randomly selected subsample (within the 135 sampled work sites) of 20%, or 27 work sites, will provide an adequate sampling of work sites for an in-depth study of quality circles to complement the qualitative aspects of the Phase II research.

Chapter 4:

INSTRUMENTATION FOR MEASURING THE IMPACT OF QUALITY CIRCLES

Objective. To develop appropriate measures of productivity and job satisfaction for both blue- and white-collar quality circles in U.S. industry that can be used during Phase II research.

Methodology. Because of the lack of prior experimental research into quality circles, an empirical identification of the variables that are closely linked with successful quality circles is still speculative. The four sources IRD used to make this tentative identification were the published writings of specialists in the fields of Japanese industry and/or participative management techniques; the published and unpublished writings of specialists in quality circles; the advice of U.S. experts in quality circles (including the expert panel discussed in Chapter 2); and the results of the May 1982 IRD survey (discussed in Chapters 2 and 3). From all of these sources variables were assembled that theoretically were associated with successful quality circles.

The specific theory upon which any given specialist based his/her critical variables differed, of course, with each investigator. IRD decided not to limit the parameters of its measurement instruments to those suggested by any one theoretical approach to group effectiveness, identifying instead the sources of variance suggested by many diverse specialists. This study's theoretical approach, then, is eclectic: it employs a Sources of Variance Model to determine test parameters. Each of these sources of variance was then cast into an objective test item format. Several

hundred items were thus produced. The items were grouped into several categories: items concerning the organization's readiness for participative management; job satisfaction in general; and characteristics of the organization's quality circle program. The instruments were designed to gauge input and outcome measures of productivity and job satisfaction in quality circles.

These instruments were piloted in a Cleveland manufacturing company by Price Gibson & Associates, Inc., a consulting firm with experience in quality circle research. Their input after this pilot test, and the input from several psychometricians, helped strengthen the content and construct validity of the instruments. IRD did not attempt to establish predictive validity due to the relatively small number of people constituting the pilot test group (under 20). Revisions were then made, although additional refinement is needed. (For example, the instruments are still somewhat long to be administered comfortably in industrial settings.) The instruments are presented in Appendix C.

Chapter 4 Conclusions.

1. Instruments. Relevant input and outcome measures have been developed and piloted by IRD to measure the effectiveness of U.S. quality circles programs, although further refinement will be needed before the instruments are deployed in Phase II research.

Chapter 5:

CHARACTERISTICS OF JAPANESE QUALITY CONTROL CIRCLES

Objective. To identify the components of successful quality control circles in Japan in order to facilitate for Phase II research the identification of problem-areas in the cross-cultural transfer to the U.S. of Japanese management technology.

Methodology. To identify the conditions associated with successful quality control circles (the preferred term in Japan), IRD gathered information on approximately 130 circles in 13 business locations in Tokyo. This chapter presents a preliminary analysis based on the first data to arrive from Japan--87 circles from nine businesses. The businesses represent a wide range: chemical (1), machinery (1), other manufacturing (2), construction (2), retail (2), and service (1). The number of employees in each location ranged from 74 to 7191. Five of the nine plants had enterprise unions, four were non-union.

Japan was selected for this comparative study because of all nations Japan has had the most experience with quality circles. The collection of these data was made possible through the cooperation of Japanese professional societies and through the presence in Japan of a leading American researcher. This allowed IRD to acquire data on Japanese quality control circles without transferring U.S. dollars to non-Americans or paying for collection of Japanese data.

The nine industrial sites were identified by the Japanese Union of Scientists and Engineers (JUSE), the organization that has coordinated the development of registered quality control circles

nationwide since 1962. JUSE identified work sites that it regarded as having successful quality control circles programs. JUSE's judgment in this matter was corroborated subsequently by the self-assessments of upper management at the nine selected plants and by the self-ratings of the 87 reporting circle leaders in these plants. Table 19 presents these ratings. NOTE: For the Japanese data the rating scale went from a high of 1 to a low of 7, unlike the scales for the U.S. data where the continuum ranged from a low of 1 to a high of 5.

TABLE 19
COMPARISON OF RATINGS BY UPPER MANAGEMENT AND QCC LEADERS
OF THE SUCCESS OF THEIR QUALITY CONTROL CIRCLES

Company	Ratings by Plant Manager							Ratings by QCC Leaders						
	1	2	3	4	5	6	7							
1		X						2.80		1.14		10		
2			X					2.90		.57		10		
3		X						3.40		.97		10		
4	X							1.62		.74		8		
5		X						1.90		.74		10		
6			X					3.20		1.23		10		
7	X							2.30		1.06		10		
8	X							2.56		1.24		9		
9			X					3.40		.84		10		

64

Rating Scale:
1=high rating
7=low rating

IRD developed, with the active collaboration of JUSE, three Japanese-language questionnaires (see Appendix D) for application in the selected locations. The three instruments were developed from an early version of the English-language instruments described in Chapter 4. The evolution of the Japanese instruments took into consideration the nature of the Japanese work setting. To assist in the transculturation of the questionnaires, input was provided by experts in Japan.

The first questionnaire was designed to be answered by someone with general knowledge of the whole company, a manager-class person. The second questionnaire was to be completed by the person who was in charge of the plants' quality control circles programs in each location, most likely by a person from the manager class. This administrator, in turn, was asked to have the leaders of 10 circles within his plant complete the third questionnaire. The selection of circle leaders was left to the discretion of the program administrator, although it was hoped that successful quality control circles would be selected--and such appears to be the case. These quality control leaders come from among the ordinary workers and not from higher positions.

The data presented in the rest of this chapter are taken from the leaders' questionnaires. This information will be of comparative interest as the characteristics of quality circles in the U.S. are examined in more detail during Phase II research. (Data from the other two questionnaires and from additional companies will appear in a forthcoming article in The Quality Circles Journal since they arrived too late for inclusion in this report.)

FINDINGS

Size and Stability of QC Circles. The average QC circle in this chapter's sample of nine companies contained slightly over seven members (7.29 years with a standard deviation [SD] of 3.26). The vast majority of the circles, 85.1% (with an SD of .36), reported that circle membership had been stable over the past 12 months.

Age of QCCs. The QC circles had been operating (by June, 1982) an average of 2.95 years (with an SD of 2.16), although some circles had been in existence less than a year while others had completed 10 years of existence.

Regularity of Meetings. When asked how often the circles met, 32.2% indicated they met at least once a week, 47.2% met about twice a month, 16.1% met monthly, and 4.5% reported meeting as needed but generally less than once a month.

Voluntary Participation. Leaders rated the extent to which their own participation in QC circles was voluntary rather highly (mean 2.36, SD 1.44) and rated their enthusiasm equally highly (mean 2.47, SD 1.21). The leaders gave a slightly lower rating to the voluntary nature and enthusiasm of the workers' participation in QC circles (mean ratings of 3.18 and 3.17, respectively; SDs 1.51 and 1.25, respectively).

Decision-Making Style. Most of the QC circles report that their objectives are set solely by the circle members, rating this item a high 2.01 (SD 1.06) out of a possible low rating of 7. There seems to be a high degree of participation by individual QC members in identifying problems, with a mean rating of 2.25 (SD 1.25). Decisions are reached by general consensus (mean 2.33, SD 1.08). When

asked how often the members of the QC circles meet outside the place of work for social purposes there was a wide range of responses: 17.5% reported meeting about once a week, 25% meet once a month, 18.8% meet about once every two months, 20% meet once every four to six months, and 18.8% meet about once a year.

Decision-Making Techniques. A wide range of problem-solving techniques were employed by the circles. The most popular techniques were brainstorming (mean rating of 1.65, SD .99), cause-and-effect diagrams (mean 1.78, SD 1.38), and graph and control sheets (mean 1.95, SD 1.39). Other popular techniques were Pareto diagrams (mean 2.32, SD 1.87), check sheets (mean 2.78, SD 1.77), and stratification (mean 3.29, SD 1.90). Two techniques that were not popular with our sample were scatter diagrams (mean 5.41, SD 1.65) and histograms (mean 4.42, SD 2.19).

Topics Dealt With. The five most popular issues that our sample dealt with were: quality (mean rating of 2.59, SD 1.71), improvement of working environment (mean 3.01, SD 1.74), productivity (mean 3.12, SD 1.82), cost reduction (mean 3.26, SD 1.92), and improvement of individual skills (mean 3.74, SD 1.97). Issues less frequently dealt with include improvement of communication (mean 4.17, SD 1.87), improvement of morale (mean 4.25, SD 1.91), and job safety (mean 4.36, SD 2.18).

Number of Problems Solved. The circles reported resolving an average of 3.21 problems within the past months (SD 2.22). The range in the number of problems resolved was between none and nine. The number of management presentations made during this period was somewhat less than the number of problems resolved, a mean of 2.51

compared to 3.21, suggesting that in some cases the circle resolves a problem without going to management for approval. In fact, it was rather common for circles to report that they can take action autonomously without management approval (mean rating of 3.37, SD 1.11).

Incentives. Of the 10 incentives which were reported by the 87 QC circles leaders to motivate their members, money was rated the least significant (mean 4.33, SD 1.80). Interestingly, prestige was rated the next least significant motivator (mean 3.92, SD 1.42). The highest reported motivators were sense of accomplishment (mean 2.36, SD 1.19), improvement of work procedures (mean 2.40, SD 1.24), improvement in interpersonal relationships (mean 2.82, SD 1.24), improvement of shop environment (mean 2.85, SD 1.42), and personal recognition (mean 2.88, SD 1.44). Other incentives, in descending order of significance, were: self development (mean 3.00, SD 1.24), feeling of being trusted (mean 3.07, SD 1.36), sense of contribution to the company (mean 3.25, SD 1.24).

Contact with Other QC Circles. A large percentage of QC circles reported working together with other circles on common programs: 40.2%. The frequency of meeting with other QC circles within the company was rated a high 2.40 (SD 1.38); meeting with circles outside the company was an uncommon experience (mean rating 5.09, SD 1.60).

Management-Worker Relations. QCC leaders were asked to assess the sufficiency of the company plans relating to employee satisfaction. The mean rating was a moderately high 3.54 (SD 1.16). The leaders gave about the same rating (mean 3.59, SD 1.30) in response to the question of whether supervisors take a personal

interest in the lives of their subordinates. On the other hand, when asked to characterize the kind of relationship that management and workers have with each other, it received high ratings: casual vs. rigid (mean 2.09, SD 1.27), harmonious vs. adversary (mean 2.85, SD 1.12), trusting vs. suspicious (mean 2.82, SD 1.18).

Internal Evaluations. The majority of our sample (64.7%) reported that they calculated the cost savings effected by their circles' suggestions. While most of the measurement focused on "tangible effects" (mean 2.77, SD 1.24), a surprising frequency of measuring intangible effects was in evidence (mean 3.09, SD 1.12).

Chapter 5 Conclusions.

Due to the preliminary nature of the analysis, no conclusions will be drawn about the nature of Japanese quality control circles at this stage. Further analysis of an expanded data base will appear in the February, 1983 issue of The Quality Circles Journal.

Chapter 6:
GENERAL CONCLUSIONS

The purpose of this research is to determine whether it is feasible to assess experimentally the effectiveness of quality circles, given the current configurations of quality circles in U.S. industry and the present state-of-the-art in evaluation designs for field research.

The answer to this question is a clear "yes." Much analysis preceded this conclusion.

Research Design. Before identifying appropriate research designs, IRD had to find out if there were enough quality circles from a representative sample of U.S. industry to include in various multitrait-multimethod experimental research designs. This task was made harder by two decisions IRD was forced to assume after considerable study of quality circles in various U.S. firms. First, that the random assignment of treatment/control conditions was not logistically viable across a broad enough range of corporate settings for the results to be generalizable to the universe of U.S. industry with functioning quality circles. Second, because of the amount of training needed to participate effectively in quality circles--the most structured form of participative management--the circles need to be past their initial pilot stage of existence before they can be included in an evaluation of the effectiveness of functioning quality circles. This status takes, in optimum circumstances, almost a year to achieve. This makes it totally unrealistic to compare quality circles and control groups that have been formed for only a short

period of time. Another weakness to this pre-post or time-series approach to outcome measurement is that over time groups within the same work environment learn what differentiates them, making maintenance of convincing placebo activities in the control group a real problem. Both of these decisions increased the importance of a large sample size representing a broad range of industry.

To get around these problems, IRD needed to identify a large enough number of work sites with regularly convening quality circles that are past the pilot stage so that stratified random sampling could be accomplished within reasonable error limits. How big a population would this have to be? The best "guesstimate" by specialists in the field was that the universe of U.S. organizations with functioning quality circles programs at the end of 1981 was between 400-500 organizations.

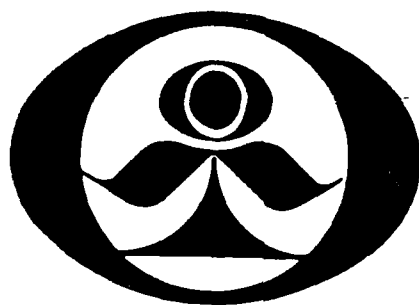
Identification of these organizations had to contend with a large problem. Namely, no one knew where they were. Through correspondence, several hundred corporations that were rumored to have quality circles were identified. But large corporations such as Xerox might have quality circles in certain locations but not in other company locations. It occurred to us that plant characteristics very probably might exert greater influence on the work climate than the characteristics of a distant corporate headquarters. If, then, learning that Xerox had quality circles did not in itself lead to an identification of the relevant entity--the work site or location that employed quality circles, how to identify those locations with functioning quality circles? Through many approaches, including two national surveys, over 1500 such work sites were pinpointed--more

than anyone else has yet identified.

Would these sites with functioning quality circles be willing to participate in government-funded research into the effectiveness of their quality circles program? Most, it developed, would. Did the sites that were willing to participate in research differ substantially from those that were not willing? Multivariate analyses provided the answer to this: no, they did not differ substantially. Was the population of available sites representative of a broad range of U.S. industry, or were most of the sites West-coast electronics companies? Fortunately, IRD succeeded in identifying a wide range of geographic locations, company size, and industry type. A 2X2X2 factorial design was found to fit the field conditions that the Phase II research would have to accommodate.

Instrumentation. Having discovered that there were enough work sites that met the criteria for inclusion in Phase II research, and having identified an appropriate design to measure the effectiveness of quality circles, the looming question was: What needs to be measured and how does one do it?

Through an extensive literature review and the ratings of an Expert Panel, and through analysis of questionnaire data from several hundred participants in quality circles (mostly facilitators and leaders), the sources of variance which affect the performance of quality circles were identified. Questionnaire items were then constructed, piloted, and subsequently refined, to measure the salient components of successful quality circles.



A P P E N D I X A

March 1982 Direct-Mail Survey
of IAQC Members



SURVEY SHEET

1. Does your firm have quality control circles (QCs)?

☐ Yes ☐ No

If yes: In what year was the first QC organized? _____

How many QCs are functioning now? _____

In how many plants? _____

Are your QCs for...

- ☐ blue-collar workers?
- ☐ non-managerial white-collar workers?
- ☐ management?

2. Where are the QC plants located? (Please use reverse side or additional sheets for noting the plant names, street addresses, city/state/ZIP, and telephone numbers if available.)

3. In what type of industry is your firm? (SIC No.: _____)

4. Do you consider your firm to be SMALL, MEDIUM, or LARGE?
(Please circle one.)

5. Would you be open to discussing the possibility of allowing us to evaluate the success of some of your QCs in the event we are funded by the government to conduct Phase II research?

- ☐ Yes
- ☐ No
- ☐ Perhaps, but the person to contact is:

Thank you for assisting us with this survey. Please enclose your business card with your response so proper credit can be given for your assistance.


H. Ned Seelye, Chairman
(312) 579-9050

A P P E N D I X B

May 1982 Survey of Readers
of The Quality Circles Journal



National Survey of Work-Sites Using Quality Circles

If your plant/office/work site in the U.S. has Quality Circles (by whatever name), please complete this survey, even if you have returned to IRD an earlier yellow survey sheet mailed to IAQC members. The results of both surveys will be reported in a forthcoming issue of *The Quality Circles Journal*.

1 What does your organization call "quality circles"?

- ☐ Quality Circles ☐ Quality Teams
☐ Quality Control Circles ☐ Other: _____

2 In what year was your facility's first quality circle organized?

- ☐ Prior to 1977 ☐ 1979 ☐ 1981
☐ 1977 ☐ 1980 ☐ 1982
☐ 1978

3 How many quality circles are functioning now at your facility? _____

4 How many members in total are involved in these quality circles at your facility? _____

5 What is the average number of members in each quality circle?

- ☐ 4 or less ☐ 11 to 15
☐ 5 to 10 ☐ Over 15

6 Approximately what percentage of employees at your facility are members of quality circles?

- ☐ Less than 10% ☐ 50% - 75%
☐ 11% - 25% ☐ Over 75%
☐ 26% - 50%

7 Are your quality circles for:

- ☐ Blue-collar workers ☐ Professional/engineer
☐ Foremen, supervisors ☐ Middle management
☐ White collar/clerical/data processing ☐ Upper management (at your facility)

8 What type of business is conducted at your facility?

- ☐ Electronics and computers ☐ Construction
☐ Machinery ☐ Retailing
☐ Chemical, petroleum, mining, rubber ☐ Services (health, legal, etc.)
☐ Food and kindred products ☐ Military (armed forces)
☐ Textile and apparel ☐ Government (local, state, federal)
☐ Paper and wood products ☐ Financial, insurance
☐ Publishing and printing ☐ Transportation
☐ Metals (+ fabricated products) ☐ Education
☐ Other manufacturing ☐ Other: _____

9 Is your organization U.S. owned?

- ☐ Yes ☐ No ☐ Partly

10 Do you consider your total corporate organization to be:

- ☐ Small ☐ Medium ☐ Large

11 How many employees are at your on-site facility?

- ☐ Under 100 employees ☐ 501-1000 employees
☐ 100-500 employees ☐ Over 1000 employees

12 Do you have a union at your facility?

- ☐ Yes ☐ No

13 Are union members involved in quality circles?

- ☐ Yes ☐ No

14 Does your facility have:

- ☐ Full-time facilitators ☐ Neither
☐ Part-time facilitators

15 How often do your quality circles meet?

- ☐ At least once a week ☐ As needed (generally less than once a month)
☐ 1 to 2 times a month

16 Approximately how many hours of initial and follow-up training hours has the average quality circle member received?

- ☐ 0-4 hours ☐ 17-25 hours
☐ 5-8 hours ☐ 26-35 hours
☐ 9-12 hours ☐ Over 36 hours
☐ 13-16 hours

17 Is participation in quality circles at your facility voluntary?

- Leaders Members Facilitator
☐ Voluntary ☐ Voluntary ☐ Voluntary
☐ Non-Voluntary ☐ Non-Voluntary ☐ Non-Voluntary

18 To what extent do your quality circles measure the unit savings resulting from circle activity (cost reductions/reduced scrap rates, etc.)?

- Never Always
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

19 On the average, how successful would you say the quality circles at your facility have been?

Mostly Failures
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 Very Successful

20 To what extent would you say your quality circles are a way of handling short-term crises rather than implementing long-term change?

Short-term, crisis oriented
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 Long-Term, on-going problem solving

21 Are your quality circles composed of persons of diverse racial backgrounds or of persons who are not native speakers of English?

Very Similar Backgrounds
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 Very Mixed Backgrounds

22 How long do your quality circles usually operate before they begin saving your organization money in excess of costs?

☐ 6 months or less
☐ 7-12 months
☐ 1 year
☐ 2 years
☐ 3 or more years
☐ They are not yet cost-effective

23 Do you see quality circles increasing in number at your facility over the next three years?

☐ Reduced in number by more than 10%
☐ Remaining at about current number
☐ Increased by 11% to 50%
☐ Increased by 51% to 99%
☐ Doubled in number
☐ Tripled in number
☐ More than tripled

24 Would you be open to discussing the possibility of allowing IRD to evaluate the success of some of your quality circles in the event we are funded next year by the government to conduct Phase II research?

☐ Yes
☐ No
☐ Perhaps, but the person to contact is:

Name _____

Title _____

Address _____

Phone _____

IMPORTANT: (Please identify yourself and your organization.)

NAME _____

TITLE _____

ORGANIZATION _____

FACILITY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

TELEPHONE () _____

Please tear out this survey page, fold in thirds with post paid business reply address on outside. Staple or tape shut before mailing. Thank you for your cooperation.



BUSINESS REPLY CARD

First Class Permit No. 87 La Grange, Illinois

Postage Will Be Paid By Addressee

INTERNATIONAL RESOURCE DEVELOPMENT, INC.

P.O. Box 721
La Grange, Illinois 60525

No Postage
Necessary
If Mailed
In The
United States

Attn: H. Ned Seelye
Chairman of the Board

Stamp Here After Filing

A P P E N D I X E

RESEARCH REPORT DISTRIBUTION LIST

A P P E N D I X C

English-Language Questionnaires:

Questionnaire for Quality Circle Program Coordinator
Questionnaire for Quality Circles Leaders
Questionnaire for Quality Circle Members
Questionnaire on General Work Conditions

QUESTIONNAIRE FOR QUALITY CIRCLES PROGRAM COORDINATOR

Plant Overview

1. Name and Address of THIS FACILITY: _____
2. Type of Business Engaged in AT THIS FACILITY: _____
3. Products manufactured, or services rendered, AT THIS FACILITY: _____
4. Number of Employees AT THIS FACILITY: _____
5. Percent of employees at this location who are directly involved with quality circles: _____%
6. Gross Annual Sales Revenues of Organization:
One billion dollars or more
\$500,000,000 to \$999,000,000
\$250,000,000 to \$499,000,000
\$25,000,000 to \$249,000,000
\$2,000,000 to \$24,000,000
\$500,000 to 1,999,000
\$100,000 to \$499,000
under \$100,000
7. Size of overall organization (taking industry type into consideration):
small; medium; large
8. Is there a union at this plant:
yes; no
9. Percent of turnover per year for hourly employees: _____%
10. Percent of turnover per year for salaried employees: _____%
11. Percent of employee turnover per year: _____%

12. Do workers receive royalties on patents they develop?:
yes; no

13. Ratio of supervisors to hourly-wage employees: _____

14. Ratio of quality assurance inspectors to workers: _____

15. Does your facility have non-English speaking employees?
yes; no

If "yes," how many people in management can talk to them in their
native language?:

front-line management _____

middle management _____

upper management: _____

Readiness for Quality Circles

16. Why were quality circles introduced at this facility?

17. Why were the first quality circles in your facility started where they
were?

18. In what month and year were quality circles first begun in this facility?
____ (month) ____ (year)

19. How many quality circles were begun during the first three months? _____

20. How many quality circles are currently in operation at this facility? _____

21. How many quality circles were stopped? _____

Management Style

	NONE				VERY MUCH
22. To what extent does the plant have production goals?	1	2	3	4	5
23. To what extent are plant goals changed or refined periodically?	1	2	3	4	5
24. To what extent are there long-range (i.e., 3 years or more) production goals?	1	2	3	4	5
25. To what extent are goals set by the work teams?	1	2	3	4	5
26. To what extent does the organization care about employee job satisfaction?	1	2	3	4	5
27. To what extent does the organization care about worker safety?	1	2	3	4	5
28. To what extent does the organization care about employee training or education?	1	2	3	4	5
29. To what extent does the plant have goals to strengthen team spirit?	1	2	3	4	5
30. To what extent are production goals set for groups, rather than for individuals?	1	2	3	4	5
31. To what extent is <u>group</u> performance evaluated and/or measured?	1	2	3	4	5
32. To what extent is problem-solving seen by management to involve lower levels of employees?	1	2	3	4	5
33. To what extent do superiors trust subordinates?	1	2	3	4	5
34. To what extent is decision-making made at or near the level where the work is actually done?	1	2	3	4	5
35. To what extent does management have personal contact with first-line employees?	1	2	3	4	5
36. To what extent is it assumed that the way to find out what the problems are is through a process of gathering new information?	1	2	3	4	5

37. To what extent is it assumed that neither management nor workers know what the problems are before an analytical study reveals them? 1 2 3 4 5

Wage/Promotion Issues

38. To what extent are hourly wage vacancies filled from within the facility? 1 2 3 4 5

39. To what extent are supervisory vacancies filled from within the facility? 1 2 3 4 5

40. To what extent are managerial vacancies filled from within the facility? 1 2 3 4 5

41. To what extent do supervisors have a harmonious (versus adversary) relationship with subordinates? 1 2 3 4 5

42. To what extent are the wage differences slight among posts of the same level? 1 2 3 4 5

43. To what extent has the facility been without the threat of a strike? 1 2 3 4 5

44. To what extent are the formal suggestions of workers followed? 1 2 3 4 5

45. To what extent are grievances responded to quickly? 1 2 3 4 5

46. To what extent are groups, rather than individuals, responsible for problem-solving? 1 2 3 4 5

47. To what extent does the facility encourage preventive problem-solving? 1 2 3 4 5

48. To what extent does one get ahead in this facility on the basis of group accomplishments? 1 2 3 4 5

49. To what extent are individual workers seen as making unique contributions? 1 2 3 4 5

50. To what extent is the means of implementing goals left to work groups? 1 2 3 4 5

Communication

51. To what extent are employees kept informed on sales and production? 1 2 3 4 5

52. To what extent does the plant have effective mechanisms for employees to register complaints? 1 2 3 4 5

53. To what extent does management feel there is no employee complaint too small to deserve a response? 1 2 3 4 5
54. To what extent does management feel there is no employee suggestion too small to deserve a response? 1 2 3 4 5
55. To what extent are employees provided on-the-job training? 1 2 3 4 5
56. To what extent are employees provided training after work hours? 1 2 3 4 5
57. To what extent are employees provided the opportunity to select courses or other training programs to take? 1 2 3 4 5
58. To what extent are employees rotated in their jobs? 1 2 3 4 5
59. To what extent do managers provide continual support of work groups? 1 2 3 4 5
60. To what extent is there a cooperative work relationship between boss and subordinate? 1 2 3 4 5
61. To what extent do supervisors work as a team with subordinates? 1 2 3 4 5
62. To what extent do supervisors take a personal interest in the lives of their subordinates? 1 2 3 4 5
63. To what extent is management in contact with workers (e.g., eat at same tables at lunch, have open offices)? 1 2 3 4 5
64. To what extent do supervisors and workers address each other on a first name basis? 1 2 3 4 5
65. To what extent do foremen and supervisors generally have more seniority than those they supervise? 1 2 3 4 5
66. To what extent do foremen and supervisors usually have advanced technical training or college education? 1 2 3 4 5

Quality Circles Characteristics

- | | | | | | |
|--|---|---|---|---|---|
| 66. To what extent were the views of all segments of the facility solicited prior to starting quality circles? | 1 | 2 | 3 | 4 | 5 |
| 67. To what extent were the attitudes of those solicited prior to the initiation of quality circles positive? | 1 | 2 | 3 | 4 | 5 |
| 68. To what extent do quality circles fit smoothly into the organization's environment? | 1 | 2 | 3 | 4 | 5 |
| 69. To what extent were the quality circles established with the intent to be permanent? | 1 | 2 | 3 | 4 | 5 |
| 70. To what extent does this facility have a leader circle? | 1 | 2 | 3 | 4 | 5 |
| 71. To what extent do leaders of one circle become members of another quality circle at an organizationally higher level? | 1 | 2 | 3 | 4 | 5 |
| 72. To what extent does management participate in quality circles? | 1 | 2 | 3 | 4 | 5 |
| 73. To what extent do white-collar employees participate in quality circles? | 1 | 2 | 3 | 4 | 5 |
| 74. To what extent do blue-collar workers participate in quality circles? | 1 | 2 | 3 | 4 | 5 |
| 75. To what extent do foremen and supervisors participate in quality circles? | 1 | 2 | 3 | 4 | 5 |
| 76. To what extent are quality circle leaders regarded as peers during the regular work week? | 1 | 2 | 3 | 4 | 5 |
| 77. To what extent were outside consultants used to help prepare the facility's employees (both management and workers) for an effective circle program? | 1 | 2 | 3 | 4 | 5 |
| 78. To what extent does the person in charge of quality circle activity (i.e., facilitator/coordinator) have that as a full-time responsibility? | 1 | 2 | 3 | 4 | 5 |

79. To what extent are the quality circle leaders chosen from among the ranks of peers? 1 2 3 4 5
80. To what extent is the union involved in planning and implementing quality circles (in facilities that are unionized)? NOTE: Leave this question blank if your facility is non-union. 1 2 3 4 5
81. To what extent do technical personnel act as resource for the quality circles? 1 2 3 4 5
82. To what extent is there an adequate budget for the quality circles? 1 2 3 4 5
83. To what extent is there an adequate budget for implementing the suggestions or solutions proposed by quality circles? 1 2 3 4 5
84. To what extent is high level management present during the quality circle presentations to management? 1 2 3 4 5
85. To what extent does top management participate in awards for quality circle achievement? 1 2 3 4 5
86. To what extent are the attitudes of circle members evaluated? 1 2 3 4 5
87. To what extent are the problem-solving skills of quality circles evaluated? 1 2 3 4 5
88. To what extent are economic savings realized by quality circle suggestions evaluated? 1 2 3 4 5
89. To what extent do you think that most of the quality circles at this facility have been very successful? 1 2 3 4 5

QUESTIONNAIRE FOR QUALITY CIRCLE LEADERS

1. What is the name of your quality circle? _____
2. How many members does the quality circle now have? _____
3. How many members did you start with? _____
4. How many members dropped out in the last 12 months? _____
5. How many members have been added in the last 12 months? _____
6. How often does the circle meet?
at least once a week
two or three times a month
monthly
as needed (but generally less than once a month)
7. How long are the circle meetings? _____
8. How many months has the circle been operating? _____ months
9. How many presentations to management did the circle make in the last 12 months? _____
10. How many of the circle suggestions did management accept during the last 12 months? _____

VERY MUCH

NONE

- | | | | | | |
|--|---|---|---|---|---|
| 11. To what extent do the meetings occur regularly? | 1 | 2 | 3 | 4 | 5 |
| 12. To what extent do you enjoy circle meetings? | 1 | 2 | 3 | 4 | 5 |
| 13. To what extent are circle activities results-oriented? | 1 | 2 | 3 | 4 | 5 |
| 14. To what extent are members of the quality circle of the same race? | 1 | 2 | 3 | 4 | 5 |

15. To what extent do members of the quality circle all speak the same language? 1 2 3 4 5
16. To what extent do you feel trained to lead effectively your quality circle? 1 2 3 4 5
17. To what extent does management support your circle's efforts? 1 2 3 4 5
18. To what extent have you improved yourself as a result of your participation in quality circles? 1 2 3 4 5
19. To what extent does the circle deal with issues of quality? 1 2 3 4 5
20. To what extent does the circle deal with issues of productivity? 1 2 3 4 5
21. To what extent does the circle deal with issues of safety? 1 2 3 4 5
22. To what extent does the quality circle deal with issues of job training? 1 2 3 4 5
23. To what extent does the circle deal with issues of job satisfaction? 1 2 3 4 5
24. To what extent do you feel the quality circle has been successful? 1 2 3 4 5
25. To what extent does the quality circle deal with continuous problems, rather than with "fire fighting" or crisis situations? 1 2 3 4 5
26. To what extent are projects selected by the circle members? 1 2 3 4 5
27. To what extent is the scope of circle activities unrestricted by management? 1 2 3 4 5
28. To what extent has membership in your circle remained stable over the past 12 months? 1 2 3 4 5
29. To what extent does management support circle activities? 1 2 3 4 5
30. To what extent is technical assistance provided to the circle? 1 2 3 4 5
31. To what extent does the circle set its own pace for problem-solving? 1 2 3 4 5
32. To what extent can the circle take action without management approval in specified situations? 1 2 3 4 5

33. To what extent do you as a circle leader have the opportunity to meet with other quality circle leaders in your organization? 1 2 3 4 5
34. To what extent do you as the circle leader have the opportunity to visit with quality circles in other organizations or to go to outside quality circle conferences, seminars or meetings? 1 2 3 4 5
35. To what extent do the circle members have the opportunity to meet with other circles in the organization? 1 2 3 4 5
36. To what extent do the circle members have the opportunity to meet with circles in other organizations or to attend quality circle conferences or meetings? 1 2 3 4 5
37. To what extent do circle members meet socially after work? 1 2 3 4 5
38. To what extent is there a formal agenda for the circle meetings? 1 2 3 4 5
39. To what extent does your circle work together with another circle? 1 2 3 4 5
40. To what extent are decisions in the circle reached by majority vote rather than by going along with someone who feels strongly about an issue? 1 2 3 4 5
41. To what extent are decisions in the circle reached by general agreement rather than by majority vote? 1 2 3 4 5
42. To what extent have you learned methods of statistical quality control? 1 2 3 4 5
43. To what extent is the leadership of the circle rotated among its members? 1 2 3 4 5
44. To what extent is there a full-time facilitator? 1 2 3 4 5
45. To what extent is the development of member skills an important aim of the circle? 1 2 3 4 5
46. To what extent do circle members complete circle assignments on their own time? 1 2 3 4 5

47. To what extent do the members of your circle learn methods of statistical quality control? 1 2 3 4 5

To what extent are the following techniques used in your circle?:

48. brainstorming	1	2	3	4	5
49. Pareto diagrams	1	2	3	4	5
50. histograms	1	2	3	4	5
51. check sheets	1	2	3	4	5
52. graphs	1	2	3	4	5
53. cause & effect (fish bone) diagrams	1	2	3	4	5
54. other:	1	2	3	4	5

55. To what extent do all members of the circle help solve problems? 1 2 3 4 5

To what extent are the following types of incentives given to circle members for good ideas? 1 2 3 4 5

56. financial	1	2	3	4	5
57. self-development	1	2	3	4	5
58. prestige	1	2	3	4	5
59. personal recognition	1	2	3	4	5

60. To what extent does the circle calculate as part of their management presentation the cost savings of their suggestions? 1 2 3 4 5

61. To what extent does the circle calculate the actual cost savings realized by their suggestions after implementation? 1 2 3 4 5

62. To what extent does management respond quickly to your circle's suggestions? 1 2 3 4 5

63. To what extent are the circle projects successful in your opinion? 1 2 3 4 5

64. To what extent is morale higher among circle members than among employees who do not belong to a circle? 1 2 3 4 5

To what extent do the circle members spend time together?

65. at work	1	2	3	4	5
66. in informal gatherings	1	2	3	4	5
67. at parties & recreation	1	2	3	4	5

AD-A118 649

INTERNATIONAL RESOURCE DEVELOPMENT INC LA GRANGE IL

F/6 5/1

EVALUATING QUALITY CIRCLES IN U.S. INDUSTRY: A FEASIBILITY STUD--ETC(U)

JUN 82 H N SEELYE, E C STEWART, J A SWEEN

N00014-82-C-0135

UNCLASSIFIED

RR-01R-82-1

NL

2 0K 2

AD A
118649



END

DATE

FILED

09:82

DTIC

QUESTIONNAIRE FOR QUALITY CIRCLE MEMBERS

<u>Characteristics of Your Quality Circle</u>	NONE	1	2	3	4	5
1. To what extent are circle projects selected by the circle members?		1	2	3	4	5
2. To what extent is the scope of circle activities unrestricted by management?	1	2	3	4	5	
3. To what extent can your circle take action to implement its solutions without management approval in specified situations?	1	2	3	4	5	
4. To what extent does management respond quickly to circle suggestions?	1	2	3	4	5	
5. Is your participation in quality circles voluntary?	1	2	3	4	5	
6. To what extent do you enjoy quality circle meetings?	1	2	3	4	5	
7. To what extent does management support your quality circle's efforts?	1	2	3	4	5	
8. To what extent do you feel trained to participate effectively in a quality circle?	1	2	3	4	5	
9. In your opinion, to what extent are the circle projects successful?	1	2	3	4	5	
10. To what extent do you get along with the other members of your quality circle?	1	2	3	4	5	
11. To what extent was the quality circle training you received useful?	1	2	3	4	5	
12. To what extent does your circle reach decisions by general agreement rather than by majority vote?	1	2	3	4	5	
13. To what extent do you socialize after work hours with members of your quality circle?	1	2	3	4	5	
14. In your opinion, to what extent is morale higher among employees who belong to a circle than among non-members?	1	2	3	4	5	
15. To what extent do you expect to acquire new skills through participation in quality circles?	1	2	3	4	5	

16. To what extent have you improved yourself as a result of your participation in quality circles? 1 2 3 4 5
17. To what extent are your quality circle meetings interesting? 1 2 3 4 5
18. To what extent do the members participate actively in your quality circle? 1 2 3 4 5
19. To what extent do you feel your ideas are valued in your quality circle? 1 2 3 4 5
20. To what extent do you feel your quality circle is "people building"? 1 2 3 4 5
21. To what extent does your quality circle focus on ways to work smarter? 1 2 3 4 5
22. To what extent do the members of your quality circle help each other throughout the week? 1 2 3 4 5
23. To what extent is your quality circle successful? 1 2 3 4 5
24. To what extent is your quality circle leader effective? 1 2 3 4 5
25. To what extent has your quality circle improved the quality of products or services? 1 2 3 4 5
26. To what extent has your quality circle improved your organization's productivity? 1 2 3 4 5
27. To what extent do you feel comfortable with the way decisions are reached in your quality circle? 1 2 3 4 5
28. To what extent do you think your involvement in circles has made you feel better about your work? 1 2 3 4 5

To what extent have you used the following techniques in your circle?:

29. brainstorming 1 2 3 4 5
30. Pareto diagrams 1 2 3 4 5
31. histograms 1 2 3 4 5
32. check sheets 1 2 3 4 5
33. graphs 1 2 3 4 5
34. cause & effect (fish bone) diagrams 1 2 3 4 5
35. other: _____ 1 2 3 4 5

QUESTIONNAIRE ON GENERAL WORK CONDITIONS

	NONE	1	2	3	4	5
1. To what extent do you feel secure in your job?		1	2	3	4	5
2. To what extent do you feel an obligation to insure that your organization's products or services are of high quality?	1	2	3	4	5	
3. To what extent do you feel that management trusts you?	1	2	3	4	5	
4. To what extent do you feel trained for your job?	1	2	3	4	5	
5. To what extent would you say you are committed to your organization?	1	2	3	4	5	
6. To what extent are you satisfied with your job?	1	2	3	4	5	
7. To what extent is there a free flow of information in your organization?	1	2	3	4	5	
8. To what extent do you take pride in your organization?	1	2	3	4	5	
9. To what extent do you trust management?	1	2	3	4	5	
10. To what extent do you take pride in your occupation?	1	2	3	4	5	
11. To what extent are you given a chance to be creative?	1	2	3	4	5	
12. To what extent do workers in your organization pass their skills on to other workers?	1	2	3	4	5	
13. To what extent do you think you have "the big picture" of what your organization is all about?	1	2	3	4	5	
14. To what extent is your organization interested in its employees?	1	2	3	4	5	
15. To what extent does management consult employees in making decisions?	1	2	3	4	5	

16. To what extent do you socialize after work hours with other employees of your organization? 1 2 3 4 5
17. To what extent do you think management knows what it is like to work at your level? 1 2 3 4 5
18. To what extent is your organization committed to employee education and training? 1 2 3 4 5
19. To what extent is management responsive to your needs? 1 2 3 4 5
20. To what extent do you think employees have a chance to advance to a position of leadership in your organization? 1 2 3 4 5
21. To what extent are you free from close supervision? 1 2 3 4 5
22. To what extent is your pay comparable to the pay of individuals doing the same work in other organizations? 1 2 3 4 5
23. To what extent is there enough variety in your work for it to be interesting? 1 2 3 4 5
24. To what extent does your job give you prestige? 1 2 3 4 5
25. To what extent are you competent to do your job? 1 2 3 4 5
26. To what extent can you use your skills in your present job? 1 2 3 4 5
27. To what extent can you use your ideas in your present job? 1 2 3 4 5
28. To what extent can you set your own work pace? 1 2 3 4 5
29. To what extent do you like to associate with the other people at work? 1 2 3 4 5
30. To what extent are working conditions safe? 1 2 3 4 5
31. To what extent is your organization "one big happy family"? 1 2 3 4 5
32. To what extent does management have personal contact with employees at your level? 1 2 3 4 5

33. To what extent do supervisors have good relations with subordinates? 1 2 3 4 5
34. To what extent are individual workers seen as making unique contributions to the organization that would be hard to replace? 1 2 3 4 5
35. To what extent does management feel that there is no employee suggestion too small to deserve a response? 1 2 3 4 5
36. To what extent do supervisors and workers address each other on a first name basis? 1 2 3 4 5
37. In your organization, to what extent is teamwork emphasized? 1 2 3 4 5
38. To what extent are employees given specific training in group approaches to problem solving? 1 2 3 4 5
39. To what extent does your organization encourage preventive problem-solving? 1 2 3 4 5
40. To what extent are groups, rather than individuals, responsible for problem-solving? 1 2 3 4 5
41. To what extent are employees advanced in your organization because of the achievement of their work group? 1 2 3 4 5

Some Information About You (for statistical purposes only)

42. Which quality circle role do you have? (CHECK ONLY ONE)
 member of a quality circle
 leader of a quality circle
 facilitator of quality circles at one facility
 coordinator of the organization's quality circles
 other: _____

43. How old are you?

16-25
 26-35
 36-45
 46-65
 over 65

44. Which sex are you?

male
 female

45. Which race are you?

Black

White

Hispanic (of any racial background)

Asian

Native American

other: _____

46. How much formal education have you had?

grade school

high school

college

post graduate

47. What is your principal home language? _____

48. Are you a union member?

yes

no

49. What is the name of your quality circle? _____

50. How many months have you belonged to this circle? _____ months

51. How many months experience have you had in quality circles? _____ months

52. How many years have you been with your present organization? _____ years

53. How many years experience do you have in the workforce? _____ years

54. Approximately how many hours of training in quality circles have you received? _____ hours

55. Is your participation in quality circles voluntary?

yes

no

A P P E N D I X D

Japanese-Language Questionnaires: *

Questionnaire for Plant Administrator
Questionnaire for Quality Circles Program Promoter
Questionnaire for Quality Circles Leaders

* Copyright © 1982 by IRD

日米Q Cサークル比較研究調査

このアンケート調査は、米国イリノイ州のI R D (International Research Development) による日本のQ Cサークル活動と、米国のQ Cサークル活動との比較研究の一環として行なうものです。お忙しいところ、たいへん恐縮ですがどうか御協力をお願いいたします。

1) 当該事業所の名称

()

所在地

()

2) 貴社の産業分野

標準産業分類番号 ()

3) 当該事業所の製造製品もしくは提供するサービス

()

4) 当該事業所の従業員数 () 人

5) 貴社全体の総従業員数 () 人

6) 貴社の自己資本 (a b c … のいずれかひとつ該当するものに○印をつけて下さい。)

a. 2億2千万円以上 (100万ドル以上)

b. 1億1千万円から2億2千万円 (50万ドル～100万ドル)

c. 5千5百万円から1億1千万円 (25万ドル～50万ドル)

d. 2千2百万円から5千5百万円 (10万ドル～25万ドル)

e. 1千1百万円から2千2百万円 (5万ドル～10万ドル)

f. 5百50万円から1千1百万円 (2.5万ドル～5万ドル)

g. 2百25万円から5百50万円 (1万ドル～2.5万ドル)

h. 550万円以下 (1万ドル以下)

7) 当該事業所には組合がありますか。 a. 企業内組合がある。 c. ない。

b. 企業内組合がある。 c. ない。

8) 当該事業所の一般従業員の数に対する監督職の比率 ()

9) 従業員に対する検査員の比率 ()

10) 事業所における従業員の民族的もしくは人種的構成

日本人 () 人 韓国人 () 人 中国人 () 人

その他 () 人

11) 事業所に日本語をあまり話せない従業員が存在する場合、管理者の方々のうち何人が少なくともその人達に対して彼らの母国語で話すことが出来ますか。

a. 上層経営陣中 () 人 b. 中堅管理職中 () 人

c. この事業所にはそのような従業員がいないので、あてはまらない。

12) この事業所には成文化された生産目標がありますか。

(どちらかに○印をつけて下さい。)

はい。いいえ

13) 事業所の生産目標は、どれくらいの期間を対象として立てられていますか。

a. 二年以下 b. 二年 c. 三年 d. 四年 e. 四年以上

14) 事業所の生産目標は、どのくらいの周期で、変更あるいは調整されていますか。

a. 1ヵ月毎 b. 3ヵ月毎 c. 6ヵ月毎 d. 1年毎 e. 1年以上毎

15) 事業所には従業員の安全に関する成文化された目標がありますか。

はい。いいえ

16) 事業所には、従業員の訓練あるいは教育に関する成文化された目標がありますか。

はい。いいえ

17) 事業所内の過去一年の従業員の離職率

() %

18) 離職者があつた場合、その空いた職場のうち何パーセントを事業所内の他の異動で補いますか。

() %

19) 過去1年間、事業所内の管理職の方々のうち何パーセント異動がありましたか。

() %

20) 過去1年間、事業所内の従業員のうち何パーセント異動がありましたか。

() %

21) 従業員は自分が開発した特許に対して使用料(ロイヤルティー)を受け取っていますか。
はい。いいえ。該当なし

22) 管理職は、出社時刻など、時間的に比較的自由が許されていますか。
(例えばパンチカード無しなど)
はい。いいえ

23) 一般従業員は、上記のような時間的自由が許されていますか。
はい。いいえ

24) 事業所では、特にどのような福祉施設を従業員に提供していますか。
a. 運動施設 b. 保養所 c. その他()

25) 事業所で、ひと月の従業員教育に使われる費用は、賃金相当月額の何パーセントになりますか。
()%

26) 従業員には、教育・訓練のコースを選ぶ自由がありますか。
はい。いいえ

27) 職制から従業員は、生産又はセールスについてどれくらい頻繁に直接指示・説明を受けますか。
a. 毎週 b. 毎月 c. 四半期毎 d. 半年毎 e. 毎年 f. あるとしてもまれに

28) 従業員には、OJT(職場内訓練)が施されていますか。
はい。いいえ

29) 従業員には、職場外における訓練が施されていますか。
はい。いいえ

30) 従業員の職技能の幅を拡げるために、担当職場のローテーションを行っていますか。

- a. 頻繁に行なっている
- b. たまに行なっている
- c. しない

31) 従業員の「仕事ぶり」は評価されていますか。
はい。いいえ

問3 2~3 3の者は下記の例にならして下さい。

32) 貴社では、QCサークル活動の成果をどのようにみていますか。

a. 有形効果面において
完全に
あがっている
ある程度
あがっている
あまり
あがっていない
全くあがっていない

b. 無形効果面において
完全に
あがっている
ある程度
あがっている
あまり
あがっていない
全くあがっていない

33) 貴社では、全般的にみて、QCサークル活動は好結果をもたらしていますか。

間違いない
もたらしている
ある程度
もたらしている
あまり
もたらしていない
全く
もたらしていない

御協力どうもありがとうございます。何か御意見がありましたら下記御自由にお書き下さい。

日米QCCサークル比較研究調査

— QCCサークル推進人へのアンケート —

このアンケート調査は、米国カリフォルニア州のI R D (International Research Development) に
よる日本のQCCサークル活動と、米国のQCCサークル活動との比較研究の一環として行なう
ものです。お忙しいところ、たいへん恐縮ですがどうか御協力をお願いいたします。
★ スケールへの回答は次の例にならして下さい。

1) この事業所で、QCCサークルを始めたのは、何年ですか。

19 年

2) 最初に始めた時に、QCCサークルは、いくつありましたか。

() サークル

3) この事業所では、現在いくつのQCCサークルが活動を続けていますか。

() サークル

4) 会社全体でみると、QCCサークル活動中の事業所は何パーセントです
か。

() %

5) この事業所の全従業員のうち何パーセントが、QCCサークルに入つて
いますか。

() %

6) 貴社のQCCサークルは、TQCの一環として活動していますか。
している していない

7) QCCサークル導入の目的は何でしたか。

8) QCCサークルは、水続的なものとして設けられましたか。

はい・いいえ

9) 職制・従業員それぞれがQCCサークル活動において効果的な役割を果
せるよう指導するために、社外コンサルタントを起用しましたか。
した・しなかつた

10) QCCサークルは、同一作業グループ(職場)内に組織されていますか。
されている されていない

11) 貴事業所のQCCサークル活動の世話人は、サークル活動推進の専任で
すか。

はい・いいえ

12) 監督職の方々は、QCCサークルの普及の活動に参加していますか。

いつも ときどき ほとんど 全く
している している していない していない

13) 管理職の方々は、QCCサークルの普及の活動に参加していますか。

いつも ときどき ほとんど 全く
している している していない していない

14) QCCサークルの目標設定について、職制が明確な指示を出していますか。

出している 出している 出していない 出していない

15) 目標を達成する手段は、QCCサークルに任されていますか。

任されている 任されている 任されていない 任されていない

16) QCCサークル活動の計画および推進に、組合が参入していますか。(事業所に組合がある場合)

している している ほとんど 全く
している している していない していない

17) QCCサークル活動において、会社の技術スタッフは援助していますか。

している している ほとんど 全く
している している していない していない

18) 職制は、Q C サークルの改善提案に対して迅速に処置していますか。

_____ している _____ あまり _____ 全く
_____ している _____ していない _____ いない

19) Q C サークル活動に必要な教育・研修のために十分な予算がありますか。

_____ 十分ある _____ 少々不足 _____ 不足
_____ だいたい _____ 十分ある

20) Q C サークル活動のテーマ解決策に経費がかかる場合、どう処置していますか。(a b c dのうち該当するものK印をつけて下さい。)

- a. 必要であれば、会社がいくらかでも援助する。
- b. ある一定の枠内で会社が援助する。
- c. しない。
- d. その他 ()

21) トップ(最上層経営陣)は、Q C サークル活動の発表、または表彰に参画しますか。

_____ 常に _____ だいたい _____ あまり _____ 全くない
_____ する _____ しない

22) 事業所全体としては、職場の「集団意識」を高める目標を持っていますか。

_____ もっている _____ ある程度 _____ あまり _____ もっていない
_____ もっている _____ もっていない

23) 事業所には、従業員間の和合的ムードを高める目標がありますか。

_____ ある _____ ある程度 _____ あまりない _____ ない
_____ ある _____ ある

24) 事業所の労働管理において、従業員の感じる「働きがい」は十分に考慮されていますか。

_____ 十分 _____ ある程度 _____ あまり _____ 全く
_____ されている _____ されている _____ されている _____ ない

25) 職制は、目標計画・設定において従業員間の参画があるべきだという姿勢をとっていますか。

_____ とっている _____ ある程度 _____ あまり _____ ほとんどない
_____ とっている _____ とっている _____ とっている _____ とっている

26) 職制は、Q C サークルの育成に絶えまなく努めていますか。

_____ 努めている _____ ある程度 _____ あまり _____ 全く
_____ 努めている _____ 努めている _____ 努めている _____ 努めている

27) 監督職の職場での監督範囲はどんなものですか。
部下の姿が...

_____ 常に _____ とまどき _____ あまり _____ 全く
_____ 見える範囲で _____ 見える範囲で _____ 見えない範囲で _____ 見えない範囲で

28) 監督者は、部下の生活に個人的な関心を抱いていますか。

_____ 抱いている _____ ある程度 _____ あまり _____ 抱いていない
_____ 抱いている _____ 抱いている _____ 抱いている _____ 抱いている

29) 職制と従業員との関係はどんなものですか。

a. 対立的 _____ 対立的 _____ 対立的 _____ 対立的
b. 好意的 _____ 好意的 _____ 好意的 _____ 好意的
c. 信頼感がある _____ 信頼感がある _____ 信頼感がある _____ 信頼感がある

30) a. 上役は、部下と親しくなるにつれて名前呼び方が変わりますか。

_____ 必ず変わる _____ ある程度 _____ あまり _____ 全く
_____ 変わる _____ 変わる _____ 変わる _____ 変わる

37) メンバーのQ Cサークルへの参加はどの程度自主的であるといえますか。

全面的に自主的に	ある程度自主的に	ある程度強制的に	全く強制的に
----------	----------	----------	--------

38) Q Cサークルのリーダーとサークルメンバーの間には隔たりがありますか。

全くない	わりとない	ある程度ある
------	-------	--------

39) この事業所のQ Cサークル活動のチームに下記のもの、それぞれどれくらい取り上げられていますか。

a. 「固有技術の向上」

ほとんど	ときどき	たまに	全くなし
------	------	-----	------

b. 「コスト」

ほとんど	ときどき	たまに	全くなし
------	------	-----	------

c. 「安全」

ほとんど	ときどき	たまに	全くなし
------	------	-----	------

d. 「品質」

ほとんど	ときどき	たまに	全くなし
------	------	-----	------

e. 「生産性」

ほとんど	ときどき	たまに	全くなし
------	------	-----	------

f. 「作業訓練」

ほとんど	ときどき	たまに	全くなし
------	------	-----	------

(裏面へつづく)

b. また、部下の上司への呼び方は変わってきましたか。

必ず変わる	ある程度変わる	あまり変わらない	全く変わらない
-------	---------	----------	---------

31) 事業所内の作業遂行責任は、どのようになっていますか。

すべて個人で責任をもつ	半々	すべて個人で責任をもつ
-------------	----	-------------

32) 職場内で自己評価は行なわれていますか。

行なわれている ・ 行なわれていない

33) 貴事業所のQ Cサークル活動は、事業所自体の運営方法とうまく組み合っていますか。

ぴったり組合っている	あまり組合っていない	全く組合っていない
------------	------------	-----------

34) 一般工場従業員は、Q Cサークル活動にどのくらい意欲的に参加していますか。

たいへん意欲的に	わりと意欲的に	わりと無気力的に	無気力的に
----------	---------	----------	-------

35) 一般事務職員は、Q Cサークル活動にどのくらい意欲的に参加していますか。

たいへん意欲的に	わりと意欲的に	わりと無気力的に	無気力的に
----------	---------	----------	-------

36) Q CサークルリーダーのQ Cサークル活動への参加は、どの程度自主的であるといえますか。

全面的に自主的に	ある程度自主的に	ある程度強制的に	全く強制的に
----------	----------	----------	--------

g.「コミュニケーションの向上」

ひんぱんに ときどき たまに 全くなし

h.「モラルの向上」

ひんぱんに ときどき たまに 全くなし

i.「職場環境の改善」

ひんぱんに ときどき たまに 全くなし

40) Q Cサークル活動の中で、どのようなものがメンバーにやりがいを感じさせていますか。

a. 金銭的報酬

多く感じさせている 全く感じさせていない

b. 自己の向上

c. 問題から認められること

d. 問題から尊敬をかうこと

e. 会社に貢献できていると

いう実感

f. 責任を与えられたという

喜び

g. 達成感

h. 作業自体の改善

i. 職場環境の改善

j. 人間関係の改善

k. その他 ()

41) Q Cサークル活動の評価は、どのようにされていますか。

a. 「有形効果」

大いに重視されている ある程度重視されている あまり重視されていない 全く重視されていない

b. 「無形効果」

大いに重視されている ある程度重視されている あまり重視されていない 全く重視されていない

42) Q Cサークル活動の成果は、期待にみあうほどあがっていますか。

a. 「有形効果」面において

完全に
あがっている 完全にあがっていない ほとんどあがっている ほとんどあがっていない 全くあがっていない

d. 「無形効果」面において

完全に
あがっている 完全にあがっていない ほとんどあがっている ほとんどあがっていない 全くあがっていない

43) 全般的にみて、Q Cサークル活動は、好結果を生み出していますか。

満足いく
生み出している 満足いく生み出している 満足いく生み出していない 満足いく生み出していない 満足いく生み出していない

御協力どうもありがとうございました。何か御意見がありましたら下記御自由にお書き下さい。

日米QCサークル比較研究調査

—QCサークルリーダーへのアンケート—

このアンケート調査は、米国イリノイ州のIRD (International Realistic Development) による、日本のQCサークル活動と、米国のQCサークル活動との比較研究の一環として行なうものです。お忙しいところ、たいへん恐縮ですがどうか御協力をお願いいたします。

★貴方のQCサークルのメンバー数()人

★過去一年間の貴QCサークルメンバーの異動。

有・無

★貴QCサークルの活動年数。()年()ヶ月

★貴QCサークルの活動の頻度。(a.b.c...の中で該当するものに○印をつけて下さい)

a.最低週に1回

b.ほぼ月に2回

c.ほぼ月に1回

d.月に平均1回未満(必要に応じて)

注)下記の質問で、答がスケールになっているときは、一番適当と思われるところ以下の下のような質問で○をつけて下さい。

1) 貴方のQCサークルのリーダーは交代制で受け持っていますか。

はい・いいえ

2) 過去一年間に貴方のQCサークルではいくつの改善提案を実行に移

しましたか。

()

3) 過去一年間に貴方のQCサークルは、いくつの発表を行ないました

か。

a. 社内発表会()回

b. 社外のQCサークル大会等()回

4) QCサークル活動のテーマ・目標は、メンバー自身によって定めら

れていますか。

必ず _____ だいたい _____ たまに _____ 全くない _____

5) ラーマに取りあげるべき職場内の問題は、フレッシュトレーニングなどでメンバー全員の見つけ出されていますか。

いつも _____ だいたい _____ ときどき _____ 全くない _____

6) サークルメンバー全員が、ラマの問題の原因追求などの議論に参加しますか。

いつも _____ だいたい _____ ときどき _____ 全くない _____

7) QCサークル内での決定事項は、全員の意見が一致してから決められますか。

いつも _____ だいたい _____ ときどき _____ 全くない _____

8) QCサークルの解決策は、職制からの許可を得なくても自分達の判断のみで実行にうつせますか。

いつも _____ だいたい _____ あまり _____ 全くない _____
うつせる _____ うつせない _____

9) 貴QCサークルでは、下記の手法が用いられていますか。

a. フレッシュトレーニング _____
よく用いられる _____ ときどき _____ たまに _____ 全くない _____

b. 層別 _____

c. パレート図 _____

d. チェンバースト _____

(自由へつづく)

- 10) 貴QCサークル活動のテーマに、下記のはそれぞれどのくらい
取り上げられていますか。
- a.「固有技術の向上」
 頻りに
とりあげられる
 ときどき
たまに
全くなし
- b.「コスト」
 全くなし
- c.「安全」
 全くなし
- d.「品質」
 全くなし
- e.「生産性」
 全くなし
- f.「作業訓練」
 全くなし
- g.「コミュニケーションの向上」
 全くなし
- h.「モラルの向上」
 全くなし
- i.「職場環境の改善」
 全くなし
- 11) いくつかのQCサークルが協力して共通の問題・テーマに取り組
むことがありますか。
 ある ・ ない

- 12) サークルメンバーは、自分達の改善案によるコスト上の効果を計算
していますか。
 している ・ していない
- 13) QCサークルにとって、協力的人間関係を育てることは、重要で
すか。
- 絶対重要
ある程度
重要
あまり
重要でない
全く重要
ではない
- 14) リーダー御自身のQCサークル活動における参加はどのようですか。
- a. 自主的
強制的
- b. 意欲的
無気力的
- 15) 貴方のサークルの他のメンバーのQCサークル活動における参加は
どうですか。
- a. 自主的
強制的
- b. 意欲的
無気力的
- 16) 貴方のサークルのモラルはどうですか。
- 高い
低い
- 17) QCサークル活動の中で、どのようなものが、メンバーにやりがい
を感じさせていますか。
- a. 金銭的報酬
多く
感じさせている
全く
感じていない
- b. 自己の向上
- c. 周囲から認められること

d. 同僚から尊敬をかうこと

多く感じさせている
全く感じさせていない

e. 会社に貢献できているという実感

f. 責任を与えられたという喜び

g. 達成感

h. 作業自体の改善

i. 職場環境の改善

j. 人間関係の改善

k. その他 ()

18) Q C サークルメンバーは、他の Q C サークルメンバーと発表会などで会うことがありますか。

a. 社内

多くある
ある程度ある
あまりない
全くない

b. 社外

多くある
ある程度ある
あまりない
全くない

19) 当事業所の労働管理において、従業員の感じる「働きがい」は十分に考慮されていると思いますか。

されている
ある程度されている
あまりされていない
されていない

20) 監督者は、部下の生活に個人的な関心を抱いていますか。

抱いている
ある程度抱いている
あまり抱いていない
抱いていない

21) 職制と従業員との関係はどんなものですか。

a. 気難
優しい
厳しい

b. 好意的
対抗的

c. 信頼感がある
信頼感がない

22) 過去一年の間、仕事やサークル活動以外で、サークルの方々同志でどれくらい頻繁に会いましたか。

a. 週に一度

b. 月に一度

c. ふた月に一度

d. 4 ~ 6 ヶ月に一度

e. 年に一度

23) Q C サークル活動の評価はどのようにされていますか。

a. 「有形効果」面において

大いにされている
ある程度されている
あまりされていない
全くされていない

b. 「無形効果」面において

大いにされている
ある程度されている
あまりされていない
全くされていない

24) 全般的にみて、Q C サークル活動は、好結果を生み出していますか。

間違いなく生み出している
ある程度生み出している
あまり生み出していない
全く生み出していない

御協力どうもありがとうございました。何か御意見がありましたら下へ御自由にお書き下さい。

Distribution List

Mandatory

- 12 Defense Technical Information Center 1
ATTN: DTIC DDA-2
Selection and Preliminary Cataloging
Section
Cameron Station
Alexandria, VA 22314
- 1 Library of Congress
Science and Technology Division
Washington, DC 20540
- 3 Office of Naval Research
Code 452
800 N. Quincy Street
Arlington, VA 22217
- 6 Naval Research Laboratory
Code 1627
Washington, DC 20375
- 1 Office of Naval Research
Director, Technology Programs
Code 200
800 N. Quincy Street
Arlington, VA 22216
- 1 Office of Naval Research
Code 450
800 N. Quincy Street
Arlington, VA 22217
- 1 Office of Naval Research
Code 458
800 N. Quincy Street
Arlington, VA 22217
- 1 Office of Naval Research
Code 455
800 N. Quincy Street
Arlington, VA 22217

ONR Field

- 1 ONR Western Regional Office
1030 E. Green Street
Pasadena, CA 91106
- 1 Psychologist
ONR Western Regional Office
1030 E. Green Street
Pasadena, CA 91106
- 1 ONR Regional Office
536 S. Clark Street
Chicago, IL 60605
- 1 Psychologist
ONR Regional Office
536 S. Clark Street
Chicago, IL 60605
- 1 Psychologist
ONR Eastern/Central Regional Office 1
Bldg. 114, Section D
666 Summer Street
Boston, MA 02210
- 1 ONR Eastern/Central Regional Office
Bldg. 114, Section D
666 Summer Street
Boston, MA 02210

OPNAV

- 1 Deputy Chief of Naval Operations
(Manpower, Personnel, and
Training)
Head, Research, Development, and
Studies Branch (Op-115)
1812 Arlington Annex
Washington, DC 20350
- 1 Director
Civilian Personnel Division
(OP-14)
Department of the Navy
1803 Arlington Annex
Washington, DC 20350
- 2 Deputy Chief of Naval Operations
(Manpower, Personnel, and
Training)
Director, Human Resource
Management Plans and Policy
Branch (Op-150)
Department of the Navy
Washington, DC 20350
- 1 Chief of Naval Operations
Head, Manpower, Personnel,
Training and Reserves Team
(Op-964D)
The Pentagon, 4A478
Washington, DC 20350
- 1 Chief of Naval Operations
Assistant, Personnel Logistics
Planning (Op-987H)
The Pentagon, 5D772
Washington, DC 20350

NAVJAT

- 1 Program Administrator for Man-
power, Personnel, and Training
MAT 0722
ATTN: A Rubenstein
800 N. Quincy Street
Arlington, VA 22217
- 1 Naval Material Command
Management Training Center
NAVJAT 09M32
Jefferson Plaza, Bldg. #2, Rm 150
1421 Jefferson Davis Highway
Arlington, VA 20360
- 1 Naval Material Command
NAVJAT-00K
Attn: J. W. Tweeddale
Washington, DC 20360
- 1 Naval Material Command
NAVJAT-00KB
Washington, DC 20360
- 1 Naval Material Command
(MAT-03)
ATTN: J. E. Colvard
Crystal Plaza #5
Room 236
2211 Jefferson Davis Highway
Arlington, VA 20360

NPRDC

- 3 Commanding Officer
Naval Personnel R&D Center
San Diego, CA 92152
- 1 Navy Personnel R&D Center
Washington Liaison Office
Building 200, 2N
Washington Navy Yard
Washington, DC 20374
- 1 Naval Personnel R&D Center
Dr. Robert Penn
San Diego, CA 92152
- 1 Naval Personnel R&D Center
Ed Aiken
San Diego, CA 92152

BUMED

- 1 Commanding Officer
Naval Health Research Center
San Diego, CA 92152
- 1 CDR William S. Maynard
Psychology Department
Naval Regional Medical Center
San Diego, CA 92134
- 1 Naval Submarine Medical
Research Laboratory
Naval Submarine Base
New London, Box 900
Groton, CT 06349
- 1 Director, Medical Service Corps
Bureau of Medicine and Surgery
Code 23
Department of the Navy
Washington, DC 20372
- 1 Naval Aerospace Medical
Research Lab
Naval Air Station
Pensacola, FL 32508
- 1 Program Manager for Human
Performance (Code 44)
Naval Medical R&D Command
National Naval Medical Center
Bethesda, MD 20014
- 1 Navy Medical R&D Command
ATTN: Code 44
National Naval Medical Center
Bethesda, MD 20014

Naval Academy and Naval Postgraduate School

- 1 Naval Postgraduate School
ATTN: Dr. Richard S. Elster
(Code 012)
Department of Administrative
Sciences
Monterey, CA 93940

Naval Academy and Naval Postgraduate School (Cont.)

- 1 Naval Postgraduate School
ATTN: Professor John Senger
Operations Research and
Administrative Science
Monterey, CA 93940
- 1 Superintendent
Naval Postgraduate School
Code 1-10
Monterey, CA 93940
- 1 Naval Postgraduate School
ATTN: Dr. James Arima
Code 1-10
Monterey, CA 93940
- 1 Naval Postgraduate School
ATTN: Dr. Richard A. McGonigal
Code 5-
Monterey, CA 93940
- 1 U.S. Naval Academy
ATTN: CDR J. M. McGrath
Department of Leadership and Law
Annapolis, MD 21402
- 1 Professor Carson K. Eovang
Naval Postgraduate School,
Code 54EG
Department of Administrative
Sciences
- 1 Superintendent
ATTN: Director of Research
Naval Academy, U.S.
Annapolis, MD 21402

HRM

- 1 Officer in Charge
Human Resource Management
Detachment
Naval Air Station
Alameda, CA 94591
- 1 Officer in Charge
Human Resource Management
Detachment
Naval Submarine Base New London
P.O. Box 31
Groton, CT 06340
- 1 Officer in Charge
Human Resource Management
Division
Naval Air Station
Mayport, FL 32228
- 1 Commanding Officer
Human Resource Management
Center
Pearl Harbor, HI 96860
- 1 Commander in Chief
Human Resource Management
Division
U.S. Pacific Fleet
Pearl Harbor, HI 96860
- 1 Officer in Charge
Human Resource Management
Detachment
Naval Base
Charleston, SC 29408

- 1 Commanding Officer
Human Resource Management School
Naval Air Station Memphis
Millington, TN 38054
- 1 Human Resource Management School
Naval Air Station Memphis (96)
Millington, TN 38054
- 1 Commanding Officer
Human Resource Management
Center
1500 Wilson Boulevard
Arlington, VA 22209
- 1 Commanding Officer
Human Resource Management
Center
5011-23 Tidewater Drive
Norfolk, VA 23511
- 1 Commander in Chief
Human Resource Management
Division
U.S. Atlantic Fleet
Norfolk, VA 23511
- 1 Officer in Charge
Human Resource Management
Detachment
Naval Air Station Whidbey Island
Oak Harbor, WA 98278
- 1 Commanding Officer
Human Resource Management
Center
Box 23
FPO New York 09510

- 1 Commander in Chief
Human Resource Management
Division
U.S. Naval Force Europe
FPO New York 09510
- 1 Officer in Charge
Human Resource Management
Detachment
Box 60
FPO San Francisco 96651
- 1 Officer in Charge
Human Resource Management
Detachment
COMNAVFORJAPAN
FPO Seattle 98762

USMC

- 1 Headquarters, U.S. Marine Corps
Code MFI-20
Washington, DC 20380
- 1 Headquarters, U.S. Marine Corps
ATTN: Dr. A.L. Slafkosky
Code RD-1
Washington, DC 20380
- 1 Education Advisor
Education Center (EC31)
MCDEC
Quantico, VA 22134

- 1 Commanding Officer
Education Center (EC31)
MCDEC
Quantico, VA 22134
- 1 Commanding Officer
U.S. Marine Corps
Command and Staff College
Quantico, VA 22134

Other Federal Government

- 1 Dr. Douglas Hunter
Defense Intelligence School
Washington, DC 20374
- 1 Dr. Brian Usilner
GAO
Washington, DC 20548
- 1 National Institute of Education
ATTN: Dr. Fritz Mulhauser
EOLC/SWO
1200 19th Street, N.W.
Washington, DC 20208
- 1 National Institute of Mental
Health
Division of Extramural Research
Programs
5600 Fishers Lane
Rockville, MD 20852
- 1 National Institute of Mental
Health
Minority Group Mental Health
Programs
Room 7 - 102
5600 Fishers Lane
Rockville, MD 20852
- 1 Office of Personnel Management
Office of Planning and Evaluation
Research Management Division
1900 E Street, N.W.
Washington, DC 20415
- 1 Office of Personnel Management
ATTN: Ms. Carolyn Burstein
1900 E Street, N.W.
Washington, DC 20415
- 1 Office of Personnel Management
ATTN: Mr. Jeff Kane
Personnel R&D Center
1900 E Street, N.W.
Washington, DC 20415
- 1 Chief, Psychological Research
Branch
ATTN: Mr. Richard Lanterman
U.S. Coast Guard (G-P-1/2/TP42)
Washington, DC 20393
- 1 Social and Developmental Psychology
Program
National Science Foundation
Washington, DC 20550

Army

- 1 Headquarters, FORSCOM
ATTN: AFPR-HR
Ft. McPherson, GA 30330
- 1 Army Research Institute
Field Unit - Leavenworth
P.O. Box 3122
Fort Leavenworth, KS 66027
- 1 Technical Director
Army Research Institute
5001 Eisenhower Avenue
Alexandria, VA 22333
- 1 Director
Systems Research Laboratory
5001 Eisenhower Avenue
Alexandria, VA 22333
- 1 Director
Army Research Institute
Training Research Laboratory
5001 Eisenhower Avenue
Alexandria, VA 22333
- 1 Dr. I. O. Jacobs
Code PERI-EM
Army Research Institute
5001 Eisenhower Avenue
Alexandria, VA 22333
- 1 COL Howard Prince
Head, Department of Behavior
Science and Leadership
U.S. Military Academy
New York 10996

Air Force

- 1 Air University Library/LSE 76-443
Maxwell AFB, AL 36112
- 1 COL John W. Williams, Jr.
Head, Department of Behavioral
Science and Leadership
U.S. Air Force Academy, CO 80840
- 1 MAJ Robert Gregory
USAF/DFBL
U.S. Air Force Academy, CO 80840
- 1 AFOSR/NL (Dr. Pregly)
Building 410
Bolling AFB
Washington, DC 20332
- 1 LTCOL Don L. Presar
Department of the Air Force
AF/MFXHM
Pentagon
Washington, DC 20330
- 1 Technical Director
AFHRL/MO(T)
Brooks AFB
San Antonio, TX 78235
- 1 AFMPC/MPCYPR
Randolph AFB, TX 78150

Current Contractors

- 1 Dr. Richard D. Arvey
University of Houston
Department of Psychology
Houston, TX 77004
- 1 Dr. Arthur Blaiwes
Human Factors Laboratory Code N-71
Naval Training Equipment Center
Orlando, FL 32813
- 1 Dr. Stuart W. Cook
Institute of Behavioral Science #6
University of Colorado
Box 482
Boulder, CO 80309
- 1 Dr. L. L. Cummings
Kellogg Graduate School of
Management
Northwestern University
Nathaniel Laverone Hall
Evanston, IL 60201
- 1 Dr. Henry Emurian
The Johns Hopkins University
School of Medicine
Department of Psychiatry and
Behavioral Science
Baltimore, MD 21205
- 1 Dr. John P. French, Jr.
University of Michigan
Institute for Social Research
P.O. Box 1248
Ann Arbor, MI 48106
- 1 Dr. Paul S. Goodman
Graduate School of Industrial
Administration
Carnegie-Mellon University
Pittsburgh, PA 15213
- 1 Bruce J. Suano De Mesquita
University of Rochester
Department of Political Science
Rochester, NY 14627
- 1 Dr. J. Richard Hackman
School of Organization and
Management
Box 1A, Yale University
New Haven, CT 06520
- 1 Dr. Lawrence R. James
School of Psychology
Georgia Institute of Technology
Atlanta, GA 30332
- 1 Dr. Frank J. Landy
The Pennsylvania State University
Department of Psychology
417 Bruce V. Moore Building
University Park, PA 16802
- 1 Dr. Bibb Latane
The Ohio State University
Department of Psychology
4048 West 17th Street
Columbus, OH 43210
- 1 Dr. Edward E. Lawler
University of Southern California
Graduate School of Business
Administration
Los Angeles, CA 90007
- 1 Dr. Edwin A. Locke
College of Business and
Management
University of Maryland
College Park, MD 20742
- 1 Dr. Fred Luthans
Regents Professor of Management
University of Nebraska - Lincoln
Lincoln, NE 68583
- 1 Dr. R. R. Mackie
Human Factors Research
Santa Barbara Research Park
6780 Cortona Drive
Goleta, CA 93017
- 1 Dr. William H. Mobley
College of Business Administration
Texas A&M University
College Station, TX 77843
- 1 Dr. Thomas M. Ostrom
The Ohio State University
Department of Psychology
116E Stadium
404C West 17th Avenue
Columbus, OH 43210
- 1 Dr. William G. Ouchi
University of California,
Los Angeles
Graduate School of Management
Los Angeles, CA 90024
- 1 Dr. Irvin G. Sarason
University of Washington
Department of Psychology, NI-25
Seattle, WA 98195
- 1 Dr. Benjamin Schneider
Department of Psychology
Michigan State University
East Lansing, MI 48824
- 1 Dr. Edgar H. Schein
Massachusetts Institute of
Technology
Sloan School of Management
Cambridge, MA 02139
- 1 H. Ned Seelye
International Resource Development,
Inc.
P.O. Box 721
La Grange, IL 60525
- 1 Dr. H. Wallace Sinaiko
Program Director, Manpower
Research and Advisory Services
Smithsonian Institution
801 N. Pitt Street, Suite 120
Alexandria, VA 22314
- 1 Dr. Richard M. Steers
Graduate School of Management
University of Oregon
Eugene, OR 97403
- 1 Dr. Siegfried Stauffert
The Pennsylvania State University
Department of Behavioral Science
Milton S. Earshey Medical Center
Hershey, PA 17033

Current Contractors (Cont.)

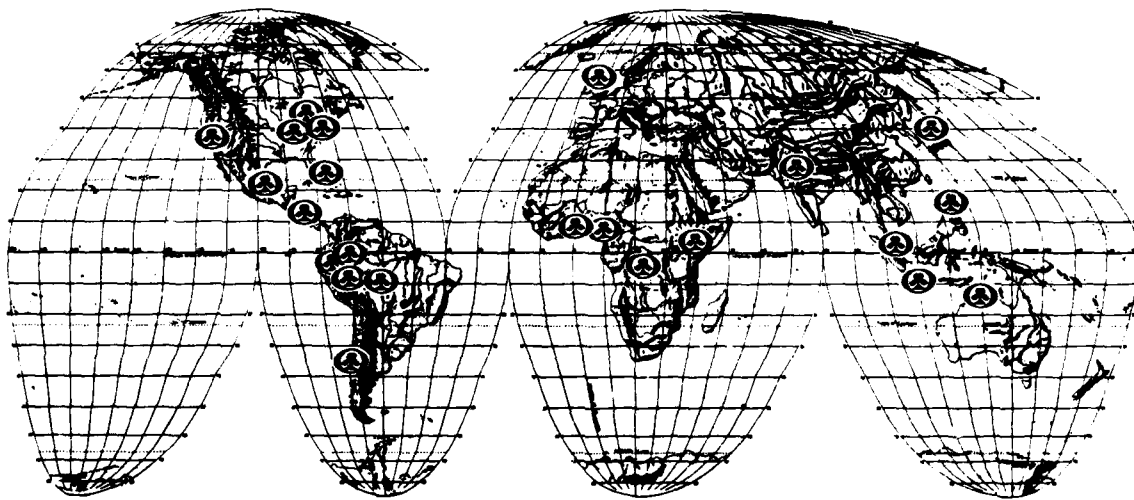
- 1 Dr. James R. Terberg
University of Oregon
West Campus
Department of Management
Eugene, OR 97403
- 1 Dr. Harry C. Triandis
Department of Psychology
University of Illinois
Champaign, IL 61820
- 1 Dr. Howard M. Weiss
Purdue University
Department of Psychological
Sciences
West Lafayette, IN 47907
- 1 Dr. Philip G. Zimbardo
Stanford University
Department of Psychology
Stanford, CA 94305



CORPORATE CAPABILITIES

International Resource Development, Inc. (IRD) is a research firm that moves quickly into a variety of settings to go after the facts—no matter how geographically and culturally inaccessible they appear to be.

It works comfortably with the non-routine, applying sophisticated analytical techniques to questions that are worth asking, and is accountable for results.



These are some of the areas of the world from which IRD has collected data.